

2015-1434

**United States Court of Appeals
for the Federal Circuit**

RUDOLPH TECHNOLOGIES, INC.,

Plaintiff-Appellee,

v.

CAMTEK, LTD.,

Defendant-Appellant.

*Appeal from the United States District Court for the District of Minnesota in
Case No. 0:05-cv-01396-JRT-FLN, John R. Tunheim, Judge*

NON-CONFIDENTIAL BRIEF FOR APPELLANT CAMTEK, LTD.

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UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

RUDOLPH TECHNOLOGIES v. CAMTEK, LTD.

2015-1434

CERTIFICATE OF INTEREST

Pursuant to Federal Circuit Rules 27(a)(7) and 47.4(a), counsel for Defendant-Appellant Camtek, Ltd. hereby certifies the following:

1. The full name of every party or amicus represented by me is:

Camtek, Ltd.

2. The name of the real party in interest (if the real party named in the caption is not the real party in interest) represented by me is:

N/A

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party or *amicus curiae* represented by me are:

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CONFIDENTIAL MATERIAL OMITTED

The material redacted from this brief is subject to a protective order. The confidential information on pages 20 relates to the Appellant's confidential technical information, including source code, which has been designated as confidential.

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STATEMENT OF RELATED CASES

Pursuant to Federal Circuit Rule 47.5, Appellant Camtek Ltd. (“Camtek”) identifies Appeal No. 2010-1458, previously before this Court, as related. Appeal No. 2010-1458, titled *August Technology Corp. v. Camtek Ltd.*, was an appeal from Case No. 05-CV-1396 (D. Minn.). A panel comprising Judges Dyk, Moore, and O’Malley issued a decision in Appeal No. 2010-1458 on August 22, 2011. *August Tech. Corp. v. Camtek Ltd.*, 655 F.3d 1278 (Fed. Cir. 2011). In addition, Camtek identifies Appeal Nos. 2012-1681, -1023 as a related case. Appeal Nos. 2012-1681, -1023, titled *August Technology Corp. v. Camtek, Ltd.*, were also appeals from Case No. 05-CV-1396 (D. Minn.). A panel comprising Judges Moore, Linn, and O’Malley issued a decision in Appeal Nos. 2012-1681, -1023 on November 18, 2013. *August Tech. Corp. v. Camtek, Ltd.*, 655 F. 3d 1278 (Fed. Cir. 2011). The present appeal also arises from the Case No. 05-CV-1396 (D. Minn.).

There are two pending district court cases related to the patent at issue in the present appeal (U.S. No. 6,826,298):

Camtek USA, Inc. v. Rudolph Techs., Inc., Case No. 15- CV-2758 (D.N.J.)

Rudolph Techs., Inc. v. Camtek Ltd., Case No. 15- CV-1246 (D. Minn.)

PRELIMINARY STATEMENT

This is the second time that this patent infringement case has come before the Court. The last time, a unanimous panel vacated the judgment of infringement against defendant Camtek because the judgment was based on an erroneous claim construction and remanded for proceedings consistent with its opinion, including a new trial on infringement based on the Court’s narrowed construction. *See August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1282-86, 1291 (Fed. Cir. 2011) (“*Camtek I*”). On remand, however, the district court did not conduct a new trial. Instead, it entered summary judgment of infringement and reinstated the damages previously awarded under the claim construction this Court rejected. (A380-A425; A433 at A441-A447.) Both rulings are erroneous.

The patent in suit claims an automated machine and method for inspecting semiconductor wafers, which are thin, round pieces of silicon that typically have multiple “dies”—individual circuits with small square borders forming a grid-like pattern—etched onto one side. Camtek produces a machine that inspects individual dies, not wafers. Plaintiff Rudolph Technologies, Inc. (“Rudolph”) nonetheless sued Camtek for infringement, and the district court held that the patent in suit covers die-inspection machines by construing the term “wafer” to include not only intact wafers, but also any part of an intact wafer such as individual dies on a wafer. (A380 at A397-A405, A408-A416.) On appeal, this

Court held this construction erroneous and adopted a narrower construction of “wafer” that includes only the intact wafer itself and not parts of the intact wafer, such as dies. *Camtek I*, 655 F.3d at 1282-86. It therefore vacated the judgment of infringement and award of damages findings based on the erroneous claim construction, and remanded for a new trial based on a correct construction. *Id.* at 1286, 1290-91.

The district court did not conduct such a trial. Instead, it granted Rudolph summary judgment on liability, holding that Camtek’s die-inspection machine infringed the patent in suit as a matter of law under this Court’s narrowed claim construction. This was error. This Court’s construction of the term wafer raised genuine issues concerning whether Camtek’s die-inspection machine infringes the patent in suit. Indeed, Rudolph failed to produce any evidence that Camtek’s machine “trains” using wafers as opposed to individual dies on an intact wafer. Nonetheless, the district court held that the machine infringes as a matter of law because the dies that it inspects are on wafers, a result that contradicts both this Court’s opinion and the intrinsic evidence. Accordingly, the judgment of infringement should be reversed.

The district court also erred in reinstating the damages awarded, which was determined under the district court’s erroneous claim construction. Under that broad construction, Camtek’s die-inspection machine inescapably infringed the

patent in suit in its default mode of operation. Under this Court's narrower claim construction, the machine at most infringed under an optional, rarely-used mode, which was unpopular and discontinued because it slowed the machine's operation. As Rudolph failed to present any evidence that this optional feature drove demand, it failed to establish any damages, much less the more than seven million dollars awarded.

The district court entered also improperly an injunction without any evidence or finding of nexus between alleged irreparable harm and infringement—a prerequisite to injunction. *See Apple, Inc. v. Samsung Elecs. Co., Ltd.*, 678 F.3d 1314, 1323-25, 1327-28 (Fed. Cir. 2012) (“*Apple I*”); 695 F.3d 1370, 1374-77 (Fed. Cir. 2012) (“*Apple II*”); 735 F.3d 1352, 1359-65 (Fed. Cir. 2012) (“*Apple III*”); (A433 at A450-A452). Finally, the district court erred in awarding nearly seven million dollars in pre-judgment interest by improperly applying Minnesota's ten percent interest rate from the date of the sale of the first infringing machine. (A433 at A447-A450; A456-A457.)

JURISDICTIONAL STATEMENT

The district court had jurisdiction under 28 U.S.C. §§1331 and 1338(a). This Court has jurisdiction under 28 U.S.C. §§1291 and 1295(a)(1).

The district court entered final judgment on February 10, 2015. Camtek filed its notice of appeal on March 9, 2015.

STATEMENT OF THE ISSUES

(1) Did the district court err when it summarily found infringement by interpreting this Court's prior construction of "wafer" and "multiple wafers" to include dies on an intact wafer that were not physically discrete substrates?

(2) Did the district court err by reinstating the jury's damages award based on lost profits without determining if the new, narrowed scope of infringement was still the cause of the lost sales?

(3) Did the district court err by entering a permanent injunction without analyzing, pursuant to *e-Bay*, whether there was a nexus between the scope of infringement and the alleged irreparable harm?

(4) Did the district court err by awarding pre-judgment interest at a 10% rate for the entire period of infringement without accounting for the date of each sale?

STATEMENT OF CASE

A. The '298 Patent and Claims 1 and 3's Wafer Inspection System and Method

The '298 patent relates to semiconductor inspection systems. Typically hundreds of "dies" or "chips," which have square borders that collectively form a grid, are present on a circular processed wafer. These dies or chips are separated ("diced") from the processed wafer and then packaged for sale.

While the '298 specification discloses both wafer inspection and die inspection embodiments, claims 1 and 3 claim only wafer inspection per this

Court's prior ruling. *Id.* at 1282-86; (JA007459-89 at claims 1 and 3.) Claims 1 and 3 require training using multiple "wafers" to develop a model and inspecting a "wafer" by comparison to the model. (JA007459-89 at claims 1 and 3.) In contrast, the parent to the '298 patent claims creating a model of a die and inspecting dies on a wafer by comparison to the model die. *Camtek I* at 1285.

B. Camtek's Accused Falcon

Camtek's Falcon inspects dies and not wafers.¹ (A6716 at A6718, A6732-A6734 (¶¶3, 31-34).) The Falcon has multiple modes of operation. (A6716 at A6718-A6719 (¶¶4-5); A6583 at A6622-A6623.) In all modes of operation, including default, the Falcon captures images of dies from a single loaded wafer and creates a model die from that single wafer using a proprietary algorithm. (A6716 at A6718-A6727 (¶¶4-20); A6583 at A6623-A6624 (¶133) .) The process starts by loading a patterned wafer into the machine. (A6716 at A6719- A6720 (¶6); A6583 at A6623-A6623 (¶¶132, 137-140) .) Several dies on the wafer are positioned under the Falcon's camera, and a computer creates a model die (or "golden die"). (A6716 at A6719-A6727 (¶¶6-20); A6583 at A6627 – A6634 (¶¶144-145, 149-167) .) The golden die represents an ideal die and not any one actual die. (*See* A6716 at A6722-A6727 (¶¶12-20).) The Falcon user then can set

¹ Camtek stopped selling the Falcon in the United States in 2009.

inspection parameters, including parameters that define the acceptable deviation from attributes of the model golden die (sometimes referred to as “min” and “max”). (A6716 at A6727-A6728 (¶¶21).) Inspection follows, and those parameters are compared to actual dies on a wafer. (A6716 at A6727-A6731, A6732-A6734 (¶¶21-28, 31-34); A6583 at A6621, A6635-A6639 (¶¶127, 170, 173-189).) The Falcon also has optional modes, including a discontinued option sometimes referred to as “clean reference” or “Adjust-to-Gold” that require additional activation steps. (A6583 at A6622-A6623; A8850 at A8859; A8942-A8944 (¶¶3-9), A8945 at A8967.) For the discontinued optional mode, the Falcon can adjust min and max inspection parameters associated with the amount of acceptable tolerances or deviations between the examined dies and the golden die. (A6716 at 6718-A6719, A6727-A6728 (¶¶4 & 21); A6583 at A6622-A6623 (¶129).) The adjusted parameters never change the golden die model. (A6716 at A6719 (¶5).)

At trial in 2009, the jury found that the Falcon machine, including in its default mode of operation, infringed claims 1 and 3 of the '298 patent. (A2224-A2227; A22857 at A22859-A22862 (2860:2-2861:17); A22633 at A22802-A22808 (2804:11-2805:2, 2806:13-2808:16).) The court instructed the jury—under its broad construction of “wafer” as “a thin slice of semiconductor material with circuitry thereon that is ready for electrical testing, or any part thereof”—which

included mere parts of a wafer, including dies on an intact wafer, to meet the claimed wafer elements. (A22633 at A22803-A22805 (2805:18-2806:2); A20591 at A20627-A20643, A20666-A20679, A20747-A20751 (629:9-638:16, 639:6-643:5, 668:17-672:10, 673:24-678:25, 679:11-22, 749:18-751:9).) The jury awarded just under seven million dollars in damages based on lost profits. (A2224 at A2230.) The district court denied Camtek’s post-trial motions to set aside the infringement and damages award and entered judgment in the amount of \$8,023,268.34, which included \$1,240,778.34 in prejudgment interest, in addition to \$645,946 in supplemental damages. (A256 at A259-A269; A245; A322 at A323.)²

C. Camtek’s Successful 2010 Appeal

On appeal, this Court held that the district court had incorrectly construed “wafer” and “multiple wafers” and vacated the judgment of infringement,

² For simplicity, Camtek uses the following shorthand for the limitations at issue:

- “model wafer limitations”: “training” of claim 1 and “training a model” of claim 3
- “multiple wafer training limitations”: “inputting of a plurality of known good quality wafers during training” of claim 1 and “training a model as to parameters of a good wafer via optical viewing of multiple known good wafers” of claim 3
- “comparing/inspecting wafers limitations”: “comparing unknown quality wafers to the model” of claim 1 and “inspecting unknown quality wafers using the model” of claim 3

damages, and injunction and remanded for a new infringement trial on the term wafer, as well as other proceedings consistent with its ruling. *Camtek I*, 655 F.3d at 1282-86, 1290-91.

This Court construed “wafer” to mean a discrete object such as a whole wafer, and not “or any part thereof.” *Id.* at 1286. It found that dies on a wafer were not discrete objects and that they were not wafers or multiple wafers. *Id.* at 1284, 1286. The Court found that, this definition included: “whole wafers, a discrete portion of a wafer (a sawn wafer or a broken wafer), and even a discrete physical substrate that includes only an individual die.” *Id.* at 1285 (emphasis added).

D. Proceedings Following Remand

On remand, Rudolph moved for summary judgment of infringement. Rudolph presented two new infringement arguments. (A7040 at A7059-A7065.) First, Rudolph argued that an optional clean reference mode that allowed the Falcon machine to automatically adjust certain inspection parameters (min and max) infringed under the new construction of wafer. Rudolph argued that creating a wafer map and a model die using multiple dies from a single wafer, and then adjusting the inspection parameters for that model when subsequent wafers were loaded into the Falcon for inspection, infringed the multiple wafer training limitations. (A7040 at A7072-A7074 (referring to “clean reference” mode).)

Second, Rudolph argued that manually adjusting the min and max inspection parameters infringed for the same reasons as above. (A7040 at A7065-A7066, A7070-A7072, A7074-A7075.)

Camtek offered un rebutted evidence showing that these modes of its Falcon machine only trained using dies on an intact wafer and not wafers. (A8306 at A8313-A8319, A8324-A8338; A5895 at A5906-A5936; A6214 at A6274, A6302, A6317-A6318; A6716 at A6717-A6731, A6733-A6734 (¶¶8, 12-20, 32-35).)

The district held that under this Court's claim construction, dies on an intact wafer are a wafer. (*E.g.* A380 at A404). As a result, it concluded that the Falcon machine satisfied the wafer, plurality of wafers, and model wafer limitations in the training elements of claims 1 and 3. (A380 at A397-A405, A408-A416.)

The district court refused to address Camtek's argument that it did not meet the model wafer limitations in the comparing/inspecting wafers elements of claims 1 and 3 that require comparing unknown wafers during inspection to the model of a wafer created during the dedicated training stage. It held that this Court's mandate prohibited it from addressing these limitations. (A380 at A402). As a result, the district court granted summary judgment of infringement.

E. Damages and Interest

After the district court entered summary judgment of infringement based on the seldom used features of the Falcon machine, Rudolph asked the Court to

reinstate the prior lost profits award. (A9099 at A9079-A9080, A9082-A9084.) Rudolph offered no new damages theory or evidence to account for the narrowed infringement scope on remand. (*See, e.g., id.*) Rudolph's damages expert neither read this Court's narrowed claim constructions, nor considered their impact on damages. (A9729-A9733 (14:22-15:20, 15:21-16:1, 21:18-22).) Rudolph's infringement theory on remand was different from its 2009 trial theory, which encompassed training a model using multiple dies on a single wafer—the Falcon's default operation. In contrast, the district court's infringement findings on remand were limited to the discontinued, optional, and rarely-used mode permitting automatic and manual adjustment of certain parameters that did not comport with the Falcon's default use. (A380 at A397-A405, A408-A416.)

The district court rejected Camtek's requests for a trial on damages to account for the new, narrowed scope of infringement. (A357-A358; A361 at A363; A380 at A393-A394; A433 at A440-A447.) The district court recognized that there were now non-infringing alternatives under this Court's new claim construction that did not exist before. (A380 at A412.) Nonetheless, the district court again reinstated the prior damage award that was based on lost profits. (A433 at A440-A447.)

The district court then awarded prejudgment interest at the annual rate of 10% for the full period of the suit—from 2005 to February 10, 2015—for a total of \$7,083,863.18. (A433 at A457-A458; A460.)

The district court also granted a new injunction without considering the nexus between the claimed irreparable harm and the patented features as narrowed by the *Camtek I* decision. (A433 at A447-A452.) The district court held that the prior 2009 injunction³ analysis was sufficient to support entry of a new injunction:

The [2009] injunction was based on the evidence presented to the jury, which the Court determined was sufficient to establish that Rudolph had “suffer[ed] and [would] continue to suffer irreparable harm, and that the remedies at law, such as monetary damages, would not adequately compensate [them] for their injury.” The Court addressed all four factors under *eBay*, concluding that a permanent injunction was appropriate to prevent future infringements by Camtek.

(A433 at A450-A451 (quoting A247 at A250-A254).) Neither the district court’s 2009 order entering an injunction nor its 2015 order entering injunction addressed nexus for the claim scope as narrowed by this Court in *Camtek I*. (See A247 at A250-A255; A433 at A447-A452.)

³ This Court vacated the 2009 injunction in its *Camtek I* mandate. *Camtek I*, 655 F.3d at 1290-91.

SUMMARY OF THE ARGUMENT

Because the district court failed to follow this Court's authoritative claim construction on remand, this Court should reverse district court's (1) infringement determinations, (2) damages determination, (3) injunction, and (4) interest award.

1. Infringement: First, the district court failed to apply this Court's definition of wafer, which found that dies on an intact wafer are not wafers. The district court again concluded that any part of a wafer, such as dies on an intact wafer, were a wafer. It then held that the wafer, plurality of wafers, and model wafer limitations in the training element of claims 1 and 3 were present in the accused Falcon machine. Had the district court used the proper construction of wafer, it should have entered summary judgment in Camtek's favor as the training limitations are not met by the Falcon machine.

Second, the district court refused to apply this Court's definitions of "wafer" and "plurality of wafers" (or "multiple wafers") to the wafer terms in the comparing/inspecting limitations. It concluded that this Court's mandate only directed it to address the term wafer in certain parts of the claims and not others. That was not this Court's mandate. Significantly, the undisputed facts showed that the Falcon machine did not meet this Court's definition of "wafer." The district court should have entered summary judgment of non-infringement in Camtek's favor because of the absence of these limitations in the Falcon machine.

2. Damages: The district court did not have authority under the *Camtek I* decision to reinstate the jury's damages verdict. This Court's ruling narrowed the claim scope and the new judgment found different modes of operation to infringe, compared to the modes that supported the original award. Establishing damages based on lost profits without any showing of causation between the new theory of infringement and the lost sales were legal error.

3. Injunction: The district court abused its discretion in entering an injunction absent any evidence of nexus between infringement and irreparable harm. The district court failed to consider the remand's narrowed claim scope and the resulting narrowed infringement findings.

4. Prejudgment Interest: The grant of nearly seven million dollars in prejudgment interest was based on an improper rate, calculation method, and time period. The district court awarded an extraordinarily high prejudgment interest rate, taxed prejudgment interest at the extraordinarily high rate for the period between the first and second judgment, and calculated prejudgment interest from the date Rudolph allegedly put Camtek on notice of infringement, rather than the date of each infringing sale. The interest rate and the district court's application of that rate are punitive—higher than any rate that could arguably compensate Rudolph.

STANDARD OF REVIEW

Construction based on the intrinsic record is a legal question reviewed *de novo*. *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015). The Federal Circuit reviews interpretation of its mandates *de novo*. *Engel Indus., Inc. v. Lockformer Co.*, 166 F.3d 1379, 1382 (Fed. Cir. 1999). Orders granting summary judgment are reviewed *de novo*, with all reasonable inferences drawn in favor of the non-movant. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255 (1986); *Rynders v. Williams*, 650 F. 3d 1188, 1194 (8th Cir. 2011). Summary judgment should be affirmed only when “there is no genuine issue as to any material fact.” *Crown Operations Int’l v. Solutia Inc.*, 289 F.3d 1367, 1375 (Fed. Cir. 2002).

Issues regarding the types of patent infringement damages legally compensable are reviewed under Federal Circuit law, without deference to the trial court. *Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 711 F.3d 1348, 1356 (Fed. Cir. 2013). Availability of lost profits is a question of law reviewed *de novo*. *Rite-Hite Corp. v. Kelley Co., Inc.*, 56 F.3d 1538, 1544 (Fed. Cir. 1995). Methodology for determining damages is reviewed for abuse of discretion, and the amount is reviewed for clear error. *Id.* at 1543-44. “The constitutional question of whether a party is entitled to a jury trial is a question of

law that this court reviews *de novo*.” *Tegal Corp. v. Tokyo Electron Am., Inc.*, 257 F.3d 1331, 1339 (Fed. Cir. 2001).

A district court’s determination of prejudgment interest is reviewed for abuse of discretion. *Bio-Rad Labs., Inc. v. Nicolet Inst. Corp.*, 807 F.2d 964, 968-69 (Fed. Cir. 1986); *R & B Appliance Parts, Inc. v. Amana Co.*, 258 F.3d 783, 787 (8th Cir. 2001).

“The decision to grant or deny permanent injunctive relief is an act of equitable discretion by the district court, reviewable on appeal for abuse of discretion.” *Apple III*, 735 F.3d at 1359 (quoting *eBay, Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006)). But to the extent the district court’s decision is based upon an issue of law, the issue is reviewed *de novo*. *Sanofi–Synthelabo v. Apotex, Inc.*, 470 F.3d 1368, 1374 (Fed. Cir. 2006).

ARGUMENT

I. THE DISTRICT COURT ERRED IN ENTERING SUMMARY JUDGMENT OF INFRINGEMENT BY INTERPRETING THIS COURT’S PRIOR CONSTRUCTIONS OF “WAFER” AND “MULTIPLE WAFERS”

A. In *Camtek I*, this Court Construed “Wafer” to Mean A Discrete Object, and Not Part of an Intact Wafer, Such as a Die

The ’298 patent discloses two embodiments: (1) wafer training and inspection and (2) die training and inspection. *See Camtek I*, 655 F.3d at 1284-86 (citing ’298 patent, col. 6 ll.65–66, 7 ll.11–34, 14 ll.15–17, 16 ll.1–8 (A476 at A489-A490, A493-A494)). Rudolph claimed only the wafer training and

inspection embodiment in the '298 patent. *Id.* at 1286 (“The inventors chose to draft claims directed to training on and inspecting multiple discrete wafers”).

In its prior decision, this Court found the district court’s construction in error “so far as it defines a wafer as any portion of a wafer having two or more die.” *Camtek I*, 655 F.3d at 1286. The claimed “wafer,” this Court found, is the discrete physical object delivered to the wafer test plate; inspection and training requires more than one of the discrete wafers. *Id.* at 1284, 1286. The subparts that make up a discrete wafer, including dies, are not the claimed “wafers.” *Id.* at 1284-86.

This Court found that:

[t]he disclosure [of the '298 patent] therefore teaches both using multiple die and multiple wafers to train. The fact that the claims at issue cover only the latter – a plurality of know good qualities wafers – is little cause for concern. ‘The mere fact that there is an alternative embodiment disclosed in the [asserted patent] that is not encompassed by [our] claim construction does not outweigh the language of the claim, especially when the court’s construction is supported by the intrinsic evidence.’

Id. at 285 (citing *Tip Sys., LLC. v. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir. 2008)).

This Court found its construction of wafer in the '298 patent to be further supported by Rudolph’s specific claiming of the die training embodiment in the parent to the '298 patent. *Camtek I*, 655 F.3d at 1285 (citing Claim 10 of U.S. Patent No. 6,324,298 (the parent patent)). A comparison of relevant portions of

'298 patent claim 3 to the parent's claim 10 highlights the distinction between wafer inspection and die inspection on a wafer:

'298 Patent, Claim 3	Parent Patent, Claim 10
An automated method of inspecting a semiconductor <u>wafer</u> in any form including...	An automated method of inspecting a <u>die</u> on a substrate such as a wafer in any form including...
training a <u>model</u> as to parameters of a good wafer via optical viewing of multiple known good wafers...	training a model as to parameters of a good <u>die</u> via optical viewing of multiple known good die, the training including...
inspecting unknown quality <u>wafers</u> using the model.	inspecting unknown quality <u>die</u> using the model, where such inspecting involves....

(Compare A476 at A497 (claim 3), with A498 at A528 (claim 10) (emphasis added).)

For the comparing/inspecting wafers limitations of claims 1 and 3, the only evidence shows the Falcon compares parts of a wafer (i.e., dies) to other parts of wafers. (A8306 at A8313-A8317 (citing A6214 at A6274); A5896 at A5906-A5909; A6716 at A6717-A6718, A6732-A6734 (¶¶3, 31-34).) For the model wafer limitations of claims 1 and 3, the evidence shows that the Falcon only models a die. (A6716 at A6717-A6721, A6722-A6727 (¶¶3-8, 12-20).) For each of the multiple wafer training limitations, the district court concluded that the use of only parts of wafers to train constitutes infringement. (A380 at A404-A405, A408-A416.) The district court's summary judgment findings are entirely

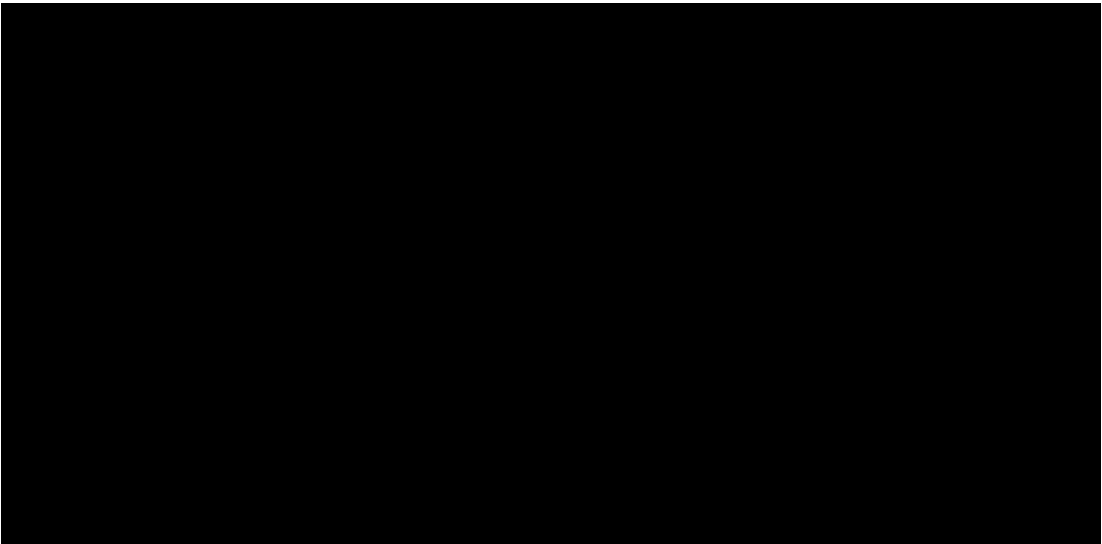
inconsistent with this Court’s holding that part of a wafer is not the claimed wafer. *Camtek I*, 655 F.3d at 1282-86. Neither the district court nor jury determined infringement using the correct construction of “wafer.” Therefore, its finding of infringement must again be reversed.

B. The District Court Erred by Ruling that Parts of Discrete Wafers Satisfy the Multiple Wafer Training Limitations

Both claims require multiple “wafers” to “train” model wafers. (A476 at A496-A497 (col.20 ll.64-65, col.22 ll.3-4).) Because the Falcon only uses dies from a discrete wafer to train—and not multiple discrete wafers—the district court’s finding of infringement for the multiple wafer training limitations is again based on its original reversed claim construction and violates this Court’s decision in *Camtek I*.

Camtek presented undisputed evidence that the Falcon machine uses dies on a wafer, rather than multiple wafers in training, to create a model die (and not a model wafer). (A6716 at A6717-A6727 (¶¶3-8, 12-20); A8306 at A8324, A8336 citing A5896 at A5909-A5918; A23425 at A23459-A23464 (36:13-39:7).) Relying on source code and the user manual, Camtek’s expert opined that dies from a single discrete wafer—not wafers—are used to create a model in all modes of operation:

Confidential Material Redacted



(A6716 at A6722 (¶12)) (emphasis added) (citing A6214 at A6270-A6271); *see also id.* at ¶¶3-8, 12-20; A8306 at A8324, A8336 citing A5896 at A5909-A5918.) Applying this Court’s constructions of “wafer” and “multiple wafers,” the Falcon cannot meet the multiple wafer training limitations. *See Camtek I*, 655 F.3d at 1282-86. The Falcon used dies to create the model die that were merely a part of an intact discrete wafer. (A6716 at A6722 (¶12)) (emphasis added) (citing A6214 at A6270-A6271); *see also id.* at A6717-A6727 (¶¶3-8, 12-20); A8306 at A8324, A8336 citing A5896 at A5909-A5918.) In other words, the Falcon did not use (1) a “wafer” to create a model or (2) a plurality of discrete wafers to create a model. (*Id.*).

Despite recognizing that “only individual die on those discrete wafers may be used [in the Falcon] at any particular step,” the district court held that a die on a wafer satisfied the claimed “wafer” element. (A380 at A408-A416.) To sidestep this Court’s construction of “wafer” that excludes parts of an intact wafer from

being considered a “wafer,” the district court stated: “Camtek was simply wrong about the Federal Circuit’s construction of wafer. Contrary to Camtek’s assertion, the Federal circuit clearly stated that a wafer could be a single die.” (A380 at A404.) The district court failed to appreciate that this Court identified only a limited instance where an individual die is a wafer: when the individual die is “a discrete physical substrate.” *Camtek I*, 655 F.3d at 1285.

Without the requirement that a single die is a wafer only when it is a discrete physical substrate, multiple dies on a wafer would necessarily constitute multiple wafers—a conclusion that this Court specifically rejected in *Camtek I*. *Id.* at 1284-86. The district court failed to account for this requirement, reverting back to its original reversed construction. (*See* A380 at A408-A416.)

C. The District Court Erred By Refusing to Apply The Definition of Wafer To The Model Wafer Limitations In The Training Element

This Court’s construction of “wafer” also necessarily impacted the model wafer limitations. *See id.*; *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1579 (Fed. Cir. 1995) (claim terms must be construed consistently). Wafer models are pertinent to the training limitations of both claim 1 and claim 3, even though they are recited in slightly different ways in those claims. In claim 3, a model of a wafer is explicitly part of the dedicated training step (“training a model as to parameters of a good wafer”) whereas in claim 1, the district court found a

model wafer to be inherently present as part of “training” in claim 1. (A476 at A496-A497 (claims 1 and 3); A200 at A218-A219.)

The district court consistently recognized that the dispute on appeal centered around the definition of wafer in the training element of claims 1 and 3. (*See, e.g.* A380 at A399 (“the training element of claim 1[framed] the dispute); *id.* at A402 (“the Court finds that the only issues it may properly address in connection with the present motions are those which relate to the training elements of claims 1 and 3”).) Nonetheless, it refused to apply this Court’s definition of wafer to the training element phrases that involved model wafers, stating that:

...because the Federal Circuit’s construction of wafer explicitly states that a wafer can be a single die, the difference between a “model die” and a “model wafer” as postulated by Camtek is irrelevant, and Camtek has presented no evidence that in light of the Federal Circuit’s new construction of the term “wafers” the jury could have erroneously concluded that Camtek created a model wafer.

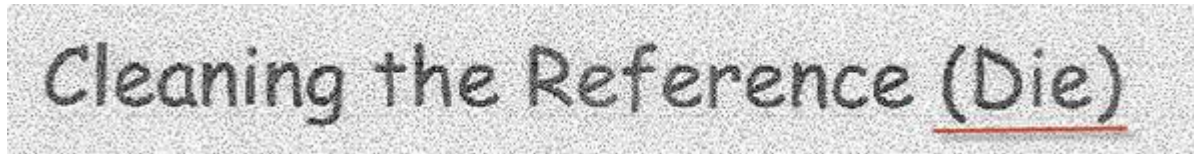
(*Id.* at A405). Further, the district court believed the issue related to the definition of “model” rather than the definition of “wafer.” (*Id.*)

The district court’s reasoning is flawed. Camtek’s Falcon machine does not meet the model wafer limitation in light of this Court’s construction of “wafer.” At best, Camtek creates a model of part of a wafer—a die on an intact wafer—which this Court held is not a wafer. *See Camtek I*, 655 F.3d at 1284-86.

Instead of applying this Court’s construction of “wafer” to the model wafer limitations, however, the district court found that a model of merely part of a wafer—just a die—meets the model wafer limitations. (A380 at A404-A405, A408-A412 (fn.8); *see* Section I.B, *supra*.) In coming to that conclusion, the district court applied the original construction struck by this Court, and its resulting summary judgment of infringement was therefore error. *See Glaxo Wellcome, Inc. v. Andrex Pharm., Inc.*, 344 F.3d 1226, 1233-35 (Fed. Cir. 2003) (vacating summary judgment of infringement based on unresolved factual issues where the appellate court corrected the claim construction of that limitation); *see also Bai v. L & L Wings, Inc.*, 160 F.3d 1350, 1353 (Fed. Cir. 1998); *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 247-50 (1986).

The district court also erred in entering summary judgment of infringement despite triable issues of fact regarding the model wafer limitations in the training element. On remand, Camtek presented evidence showing that the Falcon does not model a “wafer,” but only a die, which is merely part of a wafer. (A8306 at A8324, A8329-A8331; A6716 at A6718 – A6727 (¶¶4-8, 12-20) (citing A6214 at A6263-A6267); A5896 at A5906, A5917 – A5918); *see also Camtek I*, 655 F.3d at 1284-86. Consistent with its purpose to identify defective dies—and not defective wafers—the Falcon creates only a model die, also called a “golden die.” (A6716 at

A6718 – A6727 (¶¶4-8, 12-20) (citing A6214 at A6263-A6267).) The Falcon manual confirms that the Falcon creates a model, or a “golden,” die:



(A6214 at A6274 (emphasis added).)

This evidence precludes summary judgment of infringement. *See Anderson*, 477 U.S. at 248 (a material issue of fact exists if a reasonable jury could return a verdict for the non-moving party based at least in part on its determination of the factual question). As this Court previously acknowledged, the '298 patent distinguishes between wafer models and die models. (A6716 at A6717 – A6727 (¶¶3-6, 12-20) (citing A6214 at A6263-A6267); A476 at A489-A490, A493-A494 (col.6 ll.65–66, col.7 ll.11–34, col.8 ll.61–67, col.14 ll.15–17, col.16 ll.1–8); A498 at A528 (claim 10).) Thus, the Falcon’s model die is not a model wafer.

The district court’s reliance on the adjustment of inspection parameters using dies from other wafers in the Falcon’s accused optional modes does not change the outcome. (*Cf.* A380 at A408-A412.) At best, the adjustable min and max parameters are still only die-level, meaning that such die-level parameters could not transform a die model into a model of an intact, discrete “wafer” as claimed. (A8306 at A8324, A8329-A8331 (citing A6716 at A6718-A6727 (¶¶4-6, 12-20)); A5849 at A5859, A5870-A5871; A476 at A489-A490, A493-A494 (col.6

ll.65–66, col.7 ll.11–34, col.8 ll.61–67, col.14 ll.15–17, col.16 ll.1–8); A498 at A528 (claim 10)); *see also Camtek I*, 655 F.3d at 1282–86.

Further, as discussed in Section I.A, *supra*, the '298 patent specification discloses two embodiments: wafer training and inspection and die training and inspection. *Camtek I*, 655 F.3d at 1284–86. Rudolph claimed only a wafer training embodiment in the '298 patent. *Id.* at 1284–86. For the die training embodiment, the '298 patent defines a “model die” as a “collection of pixels representing a perfect die.” (A476 at A493 (14:41–52).) Thus, the proper construction of a “model wafer” is a “collection of pixels representing a perfect wafer.”

Under that construction, the Falcon does not infringe. The record evidence shows that, at best, the Falcon creates model die; but the Falcon's model die does not constitute pixels representing a discrete wafer. (A8306 at A8329–A8333; A6716 at A6717–A6721, A6722–A6727 (¶¶3–8, 12–20); A6214 at A6263, A6267–A6269, A6274; A5849 at A5869–A5870.) To identify defective dies, the Falcon only compares the model die to other dies—it does not compare other parts of a wafer, including “streets,” “edge beads,” and test coupons. (A8306 at A8313–A8316 citing A6072 at A6084; A6493–A6495; A6716 at A6717–A6718 (¶3).) The Falcon does not, and has no need to, create a collection of pixels representing a wafer. Because the evidence shows that the Falcon could not infringe under the

correct construction of “model wafer,” the district court erred in entering summary judgment of infringement. *See Glaxo Wellcome*, 344 F.3d at 1233-35.

D. The Mandate Rule Did Not Preclude the District Court From Applying A Proper Definition of the Term “Wafer” In The Comparing/Inspecting Wafers Limitations

1. The district court erred by refusing to apply this Court’s “wafer” construction to the comparing/inspecting wafers limitations

“Wafer” appears in the comparing/inspection limitations in claims 1 and 3.

Claim 1 states:

a microprocessor having processing and memory capabilities for *developing a model of good quality wafer* and *comparing unknown quality wafers to the model*.

(A476 at A496-A497 (claim 1) (emphasis added).) Claim 3 states:

inspecting unknown quality wafers using the model.⁴

(A476 at A497 (claim 3) (emphasis added).)

Camtek I rejected a claim interpretation that allowed only part of a wafer to be considered a claimed “wafer.” 655 F.3d at 1282-86. This construction governs the comparing/inspecting wafers limitations, as well as the training limitations. *Southwall*, 54 F.3d at 1579 (claim terms must be construed consistently); (A8306 at A8312-A8317 citing A5895 at A5906-A5909). The comparing/inspecting

⁴ “the model” relies on “a model” in the training element for its antecedent basis.

wafers limitations of claims 1 and 3 describe wafer inspection. (A476 at A496-A497 (claims 1 and 3).) Thus, just as a part of a “wafer” cannot be a “wafer” for training, it cannot be one for inspection. *See Camtek I*, 655 F.3d at 1284-86. To interpret the claims to give “wafer” inconsistent meanings violates the construction established by the *Camtek I* decision.

The district court erred in concluding that it lacked authority to apply this Court’s constructions to the comparing/inspecting wafers limitations. (A380 at A395-A403.) Contrary to the district court’s conclusion, nothing in this Court’s prior decision restricted its construction of “wafer” to the training limitation. In *Camtek I*, Camtek appealed the constructions of “wafer” and “plurality of wafers” generally. (A10041 at A10051 (issue presented: “Did the District Court err by construing “wafer” contrary to the intrinsic record?”), A10071-A10078.) This Court construed the terms “wafer” and “multiple wafers” accordingly—not restricting the applicability of the constructions to certain elements. *Camtek I*, 655 F.3d at 1286 (noting that the claimed invention is restricted to training on and inspecting wafers: “The inventors chose to draft claims directed to training on and inspecting multiple discrete wafers”).

This Court’s opinion also reflects that the broad issue on appeal was the definition of the term wafer. For example, the Court stated: “Camtek asserts that the district court erred in construing two claim limitations, “wafer” and

“strokes....” *Camtek I*, 655 F.3d at 1282. Similarly, this Court identified the two claim construction issues as: “A. A Wafer and a Plurality of Wafers” and “B. Strokes or Flashes Based on Velocity.” *Id.* at 1282, 1286.

Nonetheless, the district court found that it could not address the term wafer in any context on remand except for the context of training because this Court stated that it was remanding the case “to the district court for a limited trial on infringement with respect to this claim element” (A380 at A381 (referencing *Camtek I* at 1286).) That is incorrect. This Court remanded broadly “for further proceedings consistent” with its claim construction decision. *Camtek I*, 655 F.3d at 1291. This Court’s statement at the end of a section discussing the meaning of the term wafer does not narrow that mandate. *See Exxon Chem. Patents, Inc. v. Lubrizol Corp.*, 137 F.3d 1475, 1483-84 (Fed. Cir. 1998); *Banks v. U.S.*, 102 Fed. Cl. 115, 129-30 (Fed. Cl. Dec. 22, 2011).

By declining to address this Court’s construction of “wafer” in the comparing/inspecting limitations, the district court erroneously left intact the jury’s infringement finding for those limitations. But the jury considered only whether comparing parts of a wafer—merely dies—to the model die met the comparing/inspecting wafers limitations. (*E.g.*, A20591 at A20666-A20669, A20678-A20679 (668:17-669:18, 679:15-22).) Rudolph’s infringement evidence

is limited to its expert's 2009 trial testimony, which centered on die inspection under the reversed wafer construction:

Q So, this microprocessor generally has two functions, is that right?

A Yes.

Q What's the first one listed here?

A The first function is a -- it's a training process that we've already talked about a bit, where a good model for the wafer is produced.

Q And what's the second purpose of it?

A Well, once you have the model, then you use it to inspect die that you don't know whether there are defects or not, and that's the second part which is the inspection.

(A20666-A20669 (668:25-669:10).)

The jury thus never considered infringement under the correct construction, under which a die does not constitute a wafer. For this reason, the summary judgment of infringement should be reversed.

2. The district court erred by ignoring triable issues of fact regarding infringement of the comparing/inspecting wafers limitations

Summary judgment of infringement of the comparing/inspecting wafers limitations is further precluded by the existence of disputed issues of material fact as to whether those limitations are met. *See Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 15710-71 (Fed. Cir. 1991) (noting summary proceedings are not intended to substitute for trial necessary to determine material

facts). As an initial matter, on remand, Rudolph failed to present any evidence of infringement of the comparing/inspecting wafers limitations under this Court’s construction of “wafer.” *See Bai v. L & L Wings, Inc.*, 160 F.3d 1350, 1353 (Fed. Cir. 1998) (finding that a patentee must show that summary judgment of infringement is warranted for every disputed limitation under the proper claim construction as a matter of law); *see also Becton, Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1253 (Fed. Cir. 2010); (A7040-A7077).

Further, Camtek presented uncontroverted evidence that the Falcon does not compare discrete wafers to a model wafer. (A8306 at A8313-A8317 (citing A6214 at A6274); A5896 at A5906-A5909; A6716 at A6717-A6718, A6732-A6734 (¶¶3, 31-34); *see* Section I.C, *supra*.) Instead, the Falcon compares parts of a wafer—merely a single die—to a model die. (A8306 at A8313-A8316 (citing A6214 at A6274); A6402 at A6442, A6445 (641:8-22, 669:7-10); A6716 at A6717-A6718 (¶3); A8306 at A8314-A8316; A5896 at A5908-A5909; A6716 at A6717-A6718, A6732-A6733 (¶¶3, 31).) As Camtek’s expert testified on remand, relying on Falcon source code: “My analysis of the source code confirms that during evaluation, only a single die is compared to the golden die at a time....” (A6716 at A6734 (¶34).) At the 2009 trial, Rudolph’s expert acknowledged that the Falcon only compares dies to the model:

[O]nce we've created the model during the training phase, we apply it to die on the wafer to see if they have defects.

(A20591 at A20639-A20641.)

Wafers have features in addition to individual dies, such as “streets,” “edge beads,” and test coupons. (A8306 at A8313-A8316 citing A6072 at A6084; A6493-A6495; A6716 at A6717-A6718 (¶3).) The Falcon did not compare or inspect these portions of wafers. (A8306 at A8313-A8316 (citing A6214 at A6274); A6402 at A6442, A6445 (641:8-22, 669:7-10); A6716 at A6717-A6718 (¶3).) And the result of the Falcon’s inspection process is the identification of defective dies—not defective wafers. (A5896 at A5906-A5909; A6716 at A6717-A6719, A6727-A6731, A6733-A6734 (¶¶3-4, ¶¶21-28, ¶¶32-34); A6402 at A6442, (641:8-22); A8306 at A8315-A8316.) Thus, summary judgment of infringement is precluded because evidence that the Falcon compared or inspected dies fails to show that it compared wafers to a model wafer, as required to meet the claim elements under this Court’s construction of “wafer.” *See Camtek I*, 655 F.3d at 1284-86.

E. The District Court Erred by Accepting Evidence About Inspection Parameters and Inspection Steps To Prove The Use of Multiple Wafers During Training

In relying on inspection parameters to find infringement, the district court effectively concluded that the claimed “model” created during training is a model

die in combination with inspection parameters. (A380 at A411-A412.) The district court's effective construction is improper. *See generally Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1476, 1582 (Fed. Cir. 1996) (requiring claims be read in view of the specification); *Bai*, 160 F.3d at 1353 (stating the second step of infringement determination is whether the *properly* construed claim encompasses the accused structure); *Glaxo Wellcome*, 344 F.3d at 1233-35 (infringement determination must be based on correct claim construction).

Contrary to the district court's incorporation of inspection parameters into its definition of "model wafer," the claims and specification show that the trained "model" and "inspection parameters" are distinct. (*Cf.* A380 at A408-A412.) Claim 3, for example, recites both a model and parameters: "training a model as to parameters of a good wafer." (A476 at A497 (col.22, l. 3).) The district court's effective construction therefore fails to give each term meaning. *See Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950-51 (Fed. Cir. 2006) ("claims are interpreted with an eye toward giving effect to all terms in the claim").

Figure 3 confirms that that a model is separate from inspection parameters:

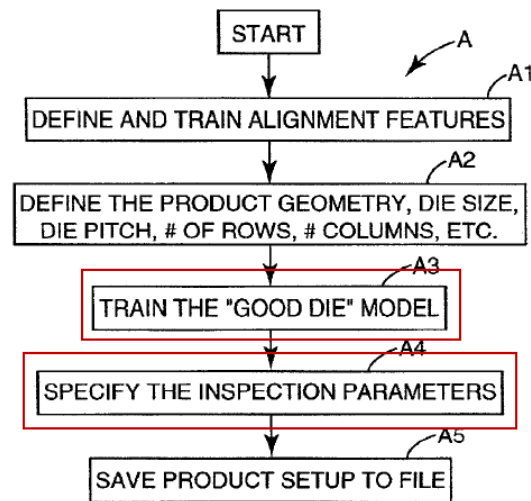


Fig. 3

(A476 at A469) (emphasis added to show the separate steps of: (1) training a model and (2) specifying inspection parameters).) Nothing in the specification supports conflating the distinct elements of a model and inspection parameters for a model. *See Bicon*, 441 F.3d at 950-51. But the only basis for the district court’s conclusion that the Falcon could use multiple wafers to train a model wafer is the district court’s effective construction including inspection parameters in the meaning of “model.” Accordingly, the district court’s finding of infringement based on including the adjustability of inspection parameters in the meaning of “model wafer” is wrong as a matter of law. *See Bai*, 160 F.3d at 1353.

Furthermore, the district court’s reliance on the adjustability of inspection parameters for subsequently-loaded wafers improperly reads out other limitations from the claims. *Bicon, Inc.*, 441 at 950-51. The claims recite separate training

and comparing/inspecting steps. (A476 at A496-A497 (col.20, ll.64-67, col.21, ll.5-11, col.22, ll.3-4, 9-15).) For the Falcon's accused optional modes, die inspection has already begun before the min and max inspection parameters can be adjusted in an allegedly-infringing manner. For the wafer used to create the model die, actual dies on that wafer are compared before a new wafer is loaded into the Falcon. (A6716 at A6718-A6719 (¶4).) Thus, before the min and max inspection parameters could be adjusted when the Falcon loads a second wafer, inspection, and not training, is already underway. (*Id.*) The parameters are not adjusted during training and are therefore not part of the single trained model recited in the claims. (*See* A476 at A496-A497 (col.20, ll.64-65, col.22, ll.3-4).) And it is that trained model that must be compared or used during inspection for infringement. (*Id.* at col.21, l.11 (“comparing unknown quality wafers to the model” (emphasis added); *id.* at col.22, l.15 (“inspecting unknown quality wafers using the model” (emphasis added))).) For this reason, too, the evidence shows that the Falcon does not infringe under the proper claim interpretation.

F. Because Rudolph Presented No Evidence Sufficient to Raise a Genuine Issue Under this Court's Claim Construction, Summary Judgment Should Have Been Entered in Camtek's Favor

Camtek sought summary judgment of no infringement both because (1) the comparing/inspecting wafers limitations are not met and (2) the model wafer limitations are not met. (A5896 at A5916-A5918 (citing A6716 at A6719-A6727

(¶¶6-8, 12-20)); A5896 at A5906-A5909 (citing A6402 at A6437-A6438, A6442, A6445 (244:21-245:24, 641:8-22, 669:7-10)); A6214 at A6274, A6317; A6716 at A6732-A6733 (¶31); A6072 at A6084; A6493-A6495).)

For the comparing/inspecting wafers limitations, Camtek presented evidence that the Falcon compared only dies and created only a model die from dies from a single discrete wafer. Rudolph presented no contradictory evidence. (A8525 at A8552-A8556.) Instead, Rudolph quoted testimony from the 2009 trial that is irrelevant given this Court's construction of "wafer." (*Id.* at A8555-A8556.) Accordingly, there is no triable issue of fact that the Falcon infringes, and summary judgment of non-infringement should have been entered on the comparing/inspecting limitations. *See Bai*, 160 F.3d at 1353 (summary judgment of noninfringement is proper where, on the record, no reasonable jury could find that every limitation recited in the properly-construed claim is in the accused device).

Because Rudolph failed to present any evidence that the accused Falcon trains a model wafer as claimed, the district court also should have granted summary judgment of non-infringement on the model wafer limitations. *See id.* Rudolph advocated an incorrect interpretation of "model wafer," claiming that a combination of the model die, inspection parameters, and a wafer map alone can satisfy the model wafer limitations. (A8525 at A8558-A8559.) As the district

court recognized, however, each of these three attributes is only arguably involved in inspection of individual dies on an intact wafer. (A380 at A409.) While the district court found that the model wafer limitations could be met by relying solely on use of the model die, (A380 at A408) (“The golden die is used to train the Falcon which dies are acceptable when it examines wafers containing dies of unknown quality”); (*id* at A411), there is no evidence that the individual die characteristics combine to meet this Court’s construction of wafer.

After the Falcon creates a constant model die, the Falcon user specifies inspection parameters including deviation tolerances from those parameters (min and max). (A5896 at A5916-A5918 citing A6716 at A6719-A6727 (¶¶6-8, 12-20); see also A6727-A6731 (¶¶21-28).) None of the model die, inspection parameters, including deviation tolerances (min and max), or wafer maps constituted a model “wafer.” (A5896 at A5916-A5918 (citing A6716 at A6719-A6727 (¶¶6-8, 12-20)).) The Falcon’s model die is a model of just a part of a wafer. *See Camtek I*, 655 F.3d at 1284-86. The min and max parameters are information about acceptable variances from the constant model die—not from a wafer. Thus, the inspection parameters are just information about a part of a wafer, not a wafer. *Id.* A wafer map is also not a wafer. A wafer map is a log of the locations of dies on a wafer and is not compared with actual dies or wafers. (A5896 at A5916-A5919 A6716 at A6731-A6732 (¶29).) Even combining all of these elements, the sum is

still limited to information about a die (part of a wafer) and die location information. (A5896 at A5916-A5919; A6716 at A6717-A6727, A6731-A6732 (¶¶2-8, 12-20, 29).)

II. THE DISTRICT COURT ERRED BY REINSTATING THE JURY’S LOST PROFITS DAMAGES AWARD WITHOUT ACCOUNTING FOR THE NARROWED SCOPE OF INFRINGEMENT NECESSITATED BY THIS COURT’S CLAIM CONSTRUCTION

A. The Narrowed Scope of Infringement Does Not Support the Damages Award

Damages and claim scope are inextricably linked; changes in claim scope due to a narrowed construction require a reevaluation of damages. *Apple, Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1315 (Fed. Cir. 2014); *Texas Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1216 (Fed. Cir. 2002) (vacating damages award based on erroneous claim constructions to the jury).

Camtek I narrowed the claims to an embodiment for inspecting whole, discrete, intact wafers. 655 F.3d at 1286. Under this Court’s claim construction, the default operation of the Falcon, which was the mode of operation that the jury found to infringe, cannot infringe the ’298 patent. (See A380 at A412.) Accordingly, the judgment of infringement on remand rests on a different theory.

The district court’s reinstatement of the vacated damages award failed to account for that change in infringement theories and the proof necessary to prove lost profits, which requires a showing that a patented feature drove the lost sales.

See Rite-Hite Corp. v. Kelley Co., Inc., 56 F.3d 1538, 1549 (Fed. Cir. 1995); *see also Versata Software Inc. v. SAP Am. Inc.*, 717 F.3d 1255, 1264 (Fed. Cir. 2013) (“Causation of lost profits is a classical jury question.”) (internal quotations omitted). Instead the district court held that, because the same number of machines infringed under the old and new claim construction, no further analysis was necessary. (A433 at A445, A447-A448). This position is aptly highlighted by Magistrate Judge Noel, who, a month before Rudolph even filed its Motion for Summary Judgment of Infringement, refused Camtek’s request for a new trial on damages and concluded:

This Court is confident that damages were properly determined by the trial court and the jury in the first trial of this case. If infringement is found on retrial, the damages for infringement will be the same under the new claim construction as the damages under the prior claim construction. There is no need for a new trial on damages. In the event infringement is found, the original damages award will be reinstated.

(A361 at A363) (denying Camtek’s motion to enforce the scheduling order and bifurcate and set schedule for proceedings addressing remedies); *see also* (A354-A356) (noting in the scheduling minutes only that a “new trial on infringement is required”).)

The district court’s cited authority does not justify reinstatement. (*See* A433 at A445-A447) (citing *Cordis Corp. v. Medtronic Vascular, Inc.*, 576 F. Supp. 2d 645 (D. Del. 2008); *Lexion Med. LLC v. Northgate Techs., Inc.*, 618 F. Supp. 2d

896, 898-900 (N.D. Ill. 2009).) The district court's primary authority, *Cordis*, involved a revised construction that *broadened* the scope of the claim rather than narrowing it. 576 F. Supp. 2d at 652 n.11-12. Further, *Cordis* analyzed the entire record, made findings, and determined that the broadened claim construction was harmless error because the construction could not affect determination of validity because of the substantial evidence of nonobviousness on the record. *Id.* at 648-51. In contrast, the district court here never determined that instructing the jury with the erroneous claim construction was harmless error; moreover, any such finding would have been entirely inconsistent with the district court's recognition that the changed construction narrowed infringement. (*See, e.g.*, A380 at A393; A433 at A445.)

The district court cited in a footnote the only other case in support of reinstatement of damages—*Lexion Med.*, 618 F. Supp. 2d 896, 898-900 (N.D. Ill. 2009). (A433 at A446 (fn.3).) In *Lexion*, the parties agreed to reinstate the damages award, No. 04-cv-5705, Docket Nos. 321, 321-1 (N.D. Ill.), in part because there was no evidence to refuse non-infringement under the mandated claim constructions, which removed prosecution disclaimer limitations, and broadened the claims on remand. *See* 618 F. Supp. 2d at 900-903. Here, this Court's claim construction narrowed the claims and the parties have not agreed to reinstate the damages award.

The district court's reinstatement accordingly was improper, and a new trial, or at least summary judgment proceedings, on damages was required.

B. Because Non-Infringing Alternatives Were Available Under this Court's Construction, there Is No Proof that Infringement Caused Lost Profits

The district court acknowledged that, under the narrowed construction, the Falcon could operate in a non-infringing manner. (D.I. 964 at 33; *see also id.* at 15.) The correct claim construction transformed the default mode the jury found infringing into a non-infringing mode on remand. (*See id.*) Available non-infringing alternatives—especially when an alternative is the default mode of operation—are fatal to establishing causation under the two tests recognized by this Court for establishing but-for causation: the *Panduit* test and the two-supplier market test. *See Calico Brand, Inc. v. Ameritek Imps., Inc.*, 527 F. App'x 987, 997 (Fed. Cir. 2013); *Micro Chem. Inc. v. Lextron Inc.*, 318 F.3d 1119, 1125 (Fed. Cir. 2003). Rudolph failed to put forth any evidence to show the non-infringing operations of the Falcon should not be accounted for in the lost profits analysis, nor could it. Therefore, the district court's reinstatement of the lost profits award, without proper analysis of the non-infringing alternative, was error. *See Wechsler v. Macke Int'l Trade, Inc.*, 486 F.3d 1286, 1293 (Fed. Cir. 2007) (for lost profits to be legally compensable, the patent owner must show causation in fact).

1. But-for causation of lost profits is lacking because there are non-infringing alternatives available

To recover lost profits, Rudolph must show causation in fact, establishing that but for the infringement, it would have made additional profits. *Id.* But-for causation cannot be presumed where there are non-infringing alternatives because customers may have selected the non-infringing alternative over the patented invention. *See Grain Processing Corp. v. Am. Maize-Products Co.*, 185 F.3d 1341, 1350-51 (Fed. Cir. 1999). Evidence of an acceptable non-infringing substitute available at the time of the alleged infringement alone can suffice to defeat lost profits. *Id.* at 1352. Here, non-infringing alternative products were available under this Court's claim construction and were purchased by customers with default mode, precluding Rudolph from establishing it would have made the sales "but for" the alleged infringement. *See, e.g., Rite-Hite*, 56 F.3d at 1545.

Neither Rudolph's evidence during the 2009 trial nor its arguments on remand establish but-for causation. At the 2009 trial, Rudolph's evidence was based on an instruction under the broader, incorrect claim construction. (A22633 at A22803-A22805 (2805:18-2806:2); A21161 at A21201-A21205, A21206–A21230) (1203:22-1205:14, 1209:11-1213:9; 1213:10-1224:4 1224:5-1229:9) .) There was no evidence of an absence of non-infringing alternatives or demand for the patented invention under the correct claim construction, (*see* A8850 at A8863-A8869; A9729-A9733 (14:22-15:20, 15:21-16:1, 21:18-22); A9394 at A9401-

A9408), and the jury did not have the opportunity to consider the effect of non-infringing operations of the Falcon.

On remand, to establish the sales Rudolph would have made to show lost profits, Rudolph was required to reconstruct the market as it would have developed absent the infringing product. *Grain Processing*, 185 F.3d at 1350. Rudolph submitted no economic proof of the market under the narrowed claims construction. And none of Rudolph's record evidence accounts for the non-infringing alternative actions Camtek would have undertaken—namely, use of its default mode. Rudolph failed to meet its burden to prove and recover lost profits. *See Grain Processing*, 185 F.3d at 1350-51.

Rudolph's failure of proof supporting its lost profits award alone shows the record cannot support the 2009 award. But here, in view of the non-infringing alternatives, Rudolph cannot establish but-for causation to support the 2009 award under the narrowed claim construction. It was legal error for the district court to reinstate damages and award lost profits.

2. The non-infringing alternatives defeat any presumption of but-for causation under the two-supplier market theory

Even under a two-supplier market theory, as relied on by Rudolph but rejected by the jury,⁵ evidence of non-infringing alternatives will defeat the presumption of causation. *See Micro Chem.*, 318 F.3d at 1125. A patent owner that proves infringement in a two-supplier market is generally entitled to a presumption of but-for causation. *Id.* The presumption does not arise, however, where the accused infringer makes a non-infringing product that is acceptable to the same market. *Id.*

Rudolph is not entitled to this presumption of causation; as found by the jury and recognized by the district court, the parties did not compete in a two-supplier market. (A256 at A268; A322-A323 (adopting A312 at A319).) But even if Rudolph were entitled to the presumption, the available, unaccused, non-infringing alternative modes of the Falcon (as purchased by customers) rebut that presumption. *See Micro Chem.*, 318 F.3d at 1125; *Grain Processing*, 185 F.3d at

⁵ The district court recognized the jury's rejection of the two-supplier theory, and Rudolph never challenged that finding; it now law of the case. (A256 at A268; A322-A323) (noting the 2009 jury award accounted for less than 100% of Camtek's sales); *see also Arizona v. California*, 460 U.S. 605, 618 (1983) (noting "when a court decides upon a rule of law, that decision should continue to govern the same issues in subsequent stages in the same case").

1351. Rudolph has not established it is entitled to lost profits as a matter of law under even its rejected market theory.

3. Rudolph did not and cannot prove an absence of issues of material fact regarding but-for causation

At a minimum, non-infringing operations of the Falcon raise a genuine issue of fact regarding whether Rudolph was entitled to lost profits. *Cf. Grain Processing*, 185 F.3d at 1354-55. The Falcon's non-infringing operations, including default mode, were available non-infringing alternatives that would have been acceptable to customers—precluding lost profits. *See id.* at 1354-55. If claim limitations could be omitted from the accused product in a manner acceptable to consumers, acceptable non-infringing substitute are readily available. *Grain Processing Corp. v. Am. Maize-Products Co.*, 979 F. Supp. 1233, 1237 (N.D. Ind. 1997), *aff'd* 185 F.3d 1341, 1354-55 (Fed. Cir. 1999) (holding that a noninfringing substitute was both “available” and “acceptable” during the accounting period, and the patentee therefore failed to show the second *Panduit* factor). Here, the evidence shows only that the now-unaccused default mode in which the Falcon was sold was acceptable, and that is how customers purchased the equipment. *See* (A20591 at A20627-A20643, A20666-A20679, A20747-A20751 (629:9-638:16, 639:6-643:5, 668:17-672:10, 673:24-678:25, 679:11-22, 749:18-751:9); A21161 at A21201-A21205, A21206–A21230 (1203:22-1205:14, 1209:11-1213:9; 1213:10-1224:4 1224:5-1229:9) .)

Similar to the accused product in *Grain Processing*, which could be altered such that some of the asserted claim limitations were removed, in its default mode, the Falcon did not train using multiple wafers. (A6716 at A6718-A6719 (¶¶4-5); A8850 at 8858, 8866 (citing A8942-A8944 (¶¶ 2-9), A8945 at A8967).) Therefore, in its default mode the Falcon was a non-infringing alternative. Only for the rare customer that used the subsequently-discontinued Adjust-to-Gold (or clean reference) option or alleged manual training option was the Falcon found to infringe. And, as the record shows, those options were rarely, if ever, used. (A8850 at A8858-A8859; A8879-A8887 (45:14-46:1; 148:9-149:3).) Rudolph's own infringement witness testified that these options were a last resort because they reduced throughput speed—the primary feature Rudolph alleged was demanded by customers. (A8850 at A8859; A8885-A8887 (148:9-149:3); *see also* A21161 at A21191 (noting the invention “provided significantly better throughput or speed” (1192:7-12).) Because of the lack of use of the Adjust-to-Gold or clean reference mode, Camtek removed it from its products in 2012. (A8850 at 8859 (citing A8942-A8944 (¶¶3-9)).)

Like the defendant in *Grain Processing*, who could have sold a non-infringing product made by merely omitting claim limitations, Camtek could have sold the Falcon even if it discontinued the rarely-used last resort features. Although the district court found the same number of Falcons were capable of

infringement under the narrowed construction, it did not consider the effect of the non-infringing operations on damages. (*See* A433 at A448; *see also* A380 at A407-A416.) On this record, the lost profits award cannot stand. There is at least a triable issue of fact whether Rudolph established an absence of available non-infringing alternatives. *See Grain Processing*, 185 F.3d at 1355.

C. The District Court Erred by Reinstating the Lost Profits Award in the Absence of Evidence of Customer Demand for the Patented Features

Rudolph was also required to demonstrate that lost profits were tied to the intrinsic value of the infringement. *See Rite-Hite*, 56 F.3d at 1548-50. Rudolph, however, presented no evidence that patented features drove customer demand. Instead, Rudolph stood on its 2009 trial record.

Just because the district court found that same number of Falcons were capable of infringement under the narrowed construction proved nothing about changed demand. (*See* A433 at A443, A445, A447-A448.) Demand for an accused product is not simply interchangeable with demand for a patented feature of the product. *Calico Brand*, 527 F. App'x at 989 (citing *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1320 (Fed. Cir. 2011); *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1337-38 (Fed. Cir. 2009)).

The only evidence of demand from the 2009 trial was that customers purchased inspection machines for the higher throughput afforded by the strobing

portion of Rudolph's claimed invention. (A22633 at A22700-A22703 (2702:13-2703:18); A20066 at A20117-A20121 (119:19-120:9); A21161 at A21190-A21192 (1192:5-19); A5603 at A5606-A5607; A8850 at A8858-A8859.) Rudolph's damages expert explained the importance of the patented technology:

Q. Did you consider the importance of the technology itself?

A. Absolutely. I mean, the invention has to do with creating a fast-moving inspection using a fast light and a continuous motion, at least that's my understanding of it as an accountant. I'm not a technical person. But that provided significantly better throughput or speed for the customers. And so if a customer bought an August system or a Falcon system, it was going to be able to get better throughput; and there are a lot of documents that talk about how throughput was very important.

(A21161 at A21191 (1192:5-16).)

But the claimed invention is not so broad under this Court's claim construction—it must both strobe in a certain way and train in a certain way. Rudolph presented no new evidence of demand for the infringing features as defined more narrowly under the proper construction. In fact, the only evidence shows that the infringing features are not in demand. The configurations and uses found to infringe on remand—automatic and manual parameter adjustment options—frustrate the only demanded feature (higher throughput). (*See* A5603 at A5606-A5607; A8850 at 8858-A8859; A23094 at A23137-A23141, A23240-

A23243 (45:14-46:1; 148:9-149:3) .) Rudolph's own witness acknowledged these options slow throughput and were undesirable and rarely if ever used. (*Id.*)

Finally, there is no evidence to suggest that Rudolph's own products practice the claimed inventions. Thus, there is no evidence of demand for the patented feature based on Rudolph's products. Accordingly, lost profits are not available here.

D. Rudolph Did Not Prove the Amount of Profits Lost Under the Correct Claim Construction

Had Rudolph proved that it was entitled to lost profits, which it did not, it was still required to prove the proper calculation of damages—including the effect of non-infringing features of the accused product. The district court denied damages discovery, however, and there is no evidence of customer demand for the patented feature under the narrowed claim construction. (A9070 at A9078-A9079, A9082-A9084; A433 at A441-A443.) Further, both Rudolph and the district court relied on the raw number of allegedly-infringing Falcons to support the damages award, but this analysis does not account for the non-infringing features of the Falcon. (*See* A433 at A447-A448; A8979 at A8980-A8982, A8989.) Rudolph is only entitled to damages to compensate it for the scope of infringement, which must be analyzed under the correct claim construction. *See Grain Processing*, 185 F.3d at 1349; *Bai*, 160 F.3d at 1353.

1. Rudolph did not meet its burden to establish the value of the patented invention under the narrowed claim construction to support lost profits

The amount of lost profits can only be based on sales of a device embodying features attributable to the patented invention. *See Ferguson Beauregard/Logic Controls, Div. of Dover Res., Inc. v. Mega Sys., LLC.*, 350 F.3d 1327, 1346 (Fed. Cir. 2003); *Rite-Hite*, 56 F.3d at 1549. Demand for an entire device is usually not interchangeable with demand for a patented feature or component within the device. *See Calico*, 527 F.3d App'x at 996. This Court's narrowed claim construction changed the features found to be embodying and attributable to the patented invention. *Camtek I*, 655 F.3d at 1286. While it was Rudolph's burden to put forth evidence to support lost profits, *Rite-Hite*, 56 F.3d at 1545, 1567, it presented no evidence to establish the calculation of damages under the correct claim construction. (*See, e.g.* A9070 at A9078-A9080, A9082-A9084.)

Rudolph did not present, and the district court did not consider, any evidence of the value of the patented features on remand. Despite admitting the Falcon can be operated in a non-infringing manner, (*e.g.* A380 at A412), Rudolph relied on reinstatement simply because "this Court again determined that all the Falcons infringe under the revised claim construction," (A9070 at A9082). But to be entitled to compensation based on the value of an entire device, Rudolph needed to prove that the Falcon derived its entire value from the use of Rudolph's invention.

Cf. Rite-Hite, 56 F.3d at 1549 (allowing damages based on value of entire apparatus because patentee proved patented feature rather than the unpatented features was the basis for customer demand). Put another way, Rudolph was required to distinguish the features that derive their existence and value from the patent. *See King Inst. Corp. v. Otari Corp.*, 767 F.2d 853, 865 (Fed. Cir. 1985); *see also Hurlbut v. Schillinger*, 130 U.S. 456, 472 (1889).

2. Rudolph's evidence does not support the district court's lost profits award under the narrowed claim construction

Rudolph did not attempt to show that Rudolph's own allegedly-competitive products actually practice the patented inventions as under the narrowed claim construction. Nor is there any evidence that the patented inventions drove demand for Rudolph products. There is no cited evidence or analysis by the district court that shows the Falcon derived its entire value or any part from any alleged ability to train using multiple wafers and velocity-based strobing.

Rudolph's only evidence of the value of infringement was its expert's 2009 trial testimony, based on the now-reversed claim scope that allegedly encompassed all configurations of the Falcon. (*E.g.*, A21161 at A21202-A21204 (1203:22-1205:14 (testifying that lost profits award should be based on the entire value of Rudolph's products), 1209:11-1213:9 (testifying that it is "not appropriate" to apportion damages based on patented features and acknowledging that entire machines do not constitute the patented invention), 1213:10-1224:4

(acknowledging unpatented features that are demanded by customers), 1224:5-1229:9 (testifying her opinion was based on a finding of no acceptable non-infringing alternatives)).)

On remand, Rudolph's damages expert presented no alternative damages theory based on the correct claim construction and infringement scope. She had no opinions that account for the demand for patented features, demand for the non-patented features, or the non-infringing uses of the Falcon. (*See* A23013 at A23025-A23029; A9729-A9733 (14:22-15:20, 15:21-16:1, 21:18-22).) Rudolph's expert had not even read this Court's narrowed claim construction. (A9729-A9733 (14:22-15:20, 15:21-16:1, 21:18-22).)

In short, there is no record evidence regarding the value of the patented technology construed under the proper claim scope. The district court's reinstatement of the damages award is therefore wholly unsupported. *Cf. King Inst.*, 767 F.2d at 865 (requiring proof of the financial and marketing dependence on the patented item to determine whether non-patented features of a machine should be included in calculating compensation for infringement). Reinstatement was an abuse of discretion. *See Ferguson Beauregard*, 350 F. 3d at 1345-46 (reversing lost profits award based on failure to allocate lost profits between aspects of the product that practice the claim invention and those that do not); *cf. Hurlbut*, 130 U.S. at 472 (award for the full value of the product was appropriate

where that value “was properly and legally attributable to the invention”); *Rite-Hite*, 56 F.3d at 1549 (permitting recovery of damages based on the value of a patentee's entire apparatus containing several features where the patent-related feature was “the basis for customer demand”).

E. Judgment as a Matter of Law that Rudolph Is Not Entitled to Lost Profits Is Appropriate Because Rudolph Failed to Present Evidence of Market Share

The reinstated award was wrong as a matter of law, even under the incorrect claim construction presented at the 2009 trial. To be entitled to lost profits, Rudolph was required to present “sound economic proof of the nature of the market and likely outcomes with infringement factored out of the economic picture.” *See Grain Processing*, 185 F.3d at 1350. Rudolph failed to meet its burden at trial, and the award is therefore unsupported as a matter of law.

Rather than submitting market share evidence to support its claims of lost profits to the jury, Rudolph relied entirely on its claim that there were only two suppliers. (*See* A8979 at A9003; A21161 at A21188; *see also* A531; A21161 at A21281-A21282.) Its damages expert admitted that she did not conduct any market share study, but instead relied on the two-supplier market theory. (A21161 at A21227 (1228:4-15).) But, as recognized by the district court, the jury rejected the 2-supplier market claim, and did not award lost profits based on a two-supplier market. (A256 at A268; A322-A323 (adopting A312 at A319).) And while

Rudolph argued a market share theory of lost profits in its opposition to Camtek's Motion for Judgment as a Matter of Law of No Lost Profits and a New Trial or Remittitur Regarding Reasonable Royalty, it was raised months after trial and far too late to support the jury's award. (*See* A3854.)

Market share analysis is critical to demonstrate what sales Rudolph would have made but-for Camtek's alleged infringement under the narrowed claim construction.⁶ *See Micro Chem.*, 318 F.3d at 1124-25. But on remand, Rudolph presented no such market share analysis or economic proof. Lacking any evidence on which the jury could have reasonably based its lost profits award, the reinstated award was wrong as a matter of law in the first instance. Camtek is entitled to judgment as a matter of law of no lost profits.

III. THE DISTRICT COURT ERRED BY ENTERING A PERMANENT INJUNCTION WITHOUT ANALYZING NEXUS BETWEEN INFRINGEMENT AND ALLEGED IRREPARABLE HARM

The district court failed to address the causal nexus requirement—rendering the injunction improper as a matter of law. *Apple I*, 678 F.3d at 1323-25, 1327-28; *Apple II*, 695 F.3d at 1374-77; *Apple III*, 735 F.3d at 1359-65. Rather than address the merits of nexus, Rudolph claimed that there is no nexus requirement and that

⁶ As discussed in Section II.B.2, *supra*, to determine the market for assessing market share, consideration of claim and infringement scope is required.

evidence of direct competition is enough. (A9805 at A9815-A9817.) The district court made no mention of nexus—despite Camtek’s objections. (A433 at A450-A452 A9394 at A9424-A9426.) But proving nexus is a requirement. The patented feature must be tied to customer demand in order to show irreparable injury from infringement. *Apple I*, 678 F.3d at 1323-25, 1327-28; *Apple II*, 695 F.3d at 1374-77; *Apple III*, 735 F.3d at 1359-65. And this Court’s narrowed claim construction of “wafer” and the resulting narrowed infringement scope must be considered in weighing whether an injunction should be entered. *Cf. Apple-Motorola*, 757 F.3d 1286, 1315 (finding that another remedial measure, damages, must be re-determined following a changed claim construction and infringement scope).

The record lacks any evidence that customers demand the two optional configurations found to infringe. There is no evidence that customers purchased the Falcon because of the discontinued optional automatic parameter adjustment mode (in combination with the other claim limitations). (A9394 at A9424-A9426.) The record similarly lacks any evidence that customers purchased the Falcon for its alleged ability to manually adjust parameters. (*Id.*) Rudolph’s irreparable harm expert admitted that she had never even read or considered this Court’s construction. (A9729-A9733 (14:22-15:20, 15:21-16:1, 21:18-22).) And, given that the accused Falcon has multiple non-infringing configurations and uses under the narrowed claim and infringement scope—including its default mode of

operation—it would be error to presume that demand for the Falcon is linked in any way to infringement or that the harm allegedly suffered by Rudolph has any relation to infringement. (*See supra*, Sections I-II.) Accordingly, the district court’s entry of injunction was an abuse of discretion. *E.g. Apple III*, 735 F.3d at 1359-65.

IV. THE DISTRICT COURT ERRED BY AWARDING PREJUDGMENT INTEREST AT A 10% RATE FOR THE ENTIRE PERIOD OF ALLEGED INFRINGEMENT

The district court awarded prejudgment interest of over \$7 million—nearly equal to the amount of total damages awarded. (A460 at A460-A461 (¶3(b)).) Such an award overstates Rudolph’s alleged loss and overpays Rudolph, violating the compensatory purpose of prejudgment interest. *See Oiness v. Walgreen Co.*, 88 F.3d 1025, 1033 (Fed. Cir. 1996). The interest award should be vacated for four reasons: (1) no prejudgment interest is warranted due to Rudolph’s cause in delay of judgment; (2) the district court used an incorrect interest rate; (3) the district court extended the prejudgment interest period too far; and (4) the district court began the prejudgment interest period too early.

First, it was Rudolph’s burden to prove entitlement to prejudgment interest, and then to prove the appropriate interest rate. *Laitram Corp. v. NEC Corp.*, 115 F.3d 947, 955 (Fed. Cir. 1997). Here, Rudolph did neither. Rudolph did not show that it is entitled to prejudgment interest; it was Rudolph that insisted on the erroneous claim construction, causing five years of delay. (*See generally*, A200 at

A207-A212; *Crystal Semiconductor Corp. v. TriTech Microelectronics Int'l, Inc.*, 246 F.3d 1336, 1361-62 (Fed. Cir. 2001).) Rudolph's pursuit of incorrect claim constructions does not justify years of interest. It certainly does not warrant millions in interest for the years that Camtek has spent challenging the incorrect constructions and resulting infringement, damages, and injunction findings.

Second, Rudolph did not put forth evidence sufficient to show a 10% interest rate is an appropriate compensatory rate. *See Laitram*, 115 F.3d at 955; (upholding T-Bill interest rate where patentee did not show higher rate was justified). Rudolph made no showing, for example, that it had to borrow at a rate at or near 10% due to the uncompensated infringement. *Cf. Mars, Inc. v. Coin Acceptors, Inc.*, 513 F. Supp. 2d 128, 136-37 (D.N.J. 2007) (finding that the treasury bill rate "should be used as a baseline investment rate absent some evidence that the patent holder is entitled to a better rate"). There is no showing that the award of prejudgment interest has any relationship to compensating Rudolph for the alleged infringement at all. (*See* A9070 at A9084-A9089; *cf. Gen. Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655 (1983) (prejudgment interest should compensate for the foregone use of the royalty).) It was an abuse of discretion for the district court to award prejudgment interest because Rudolph failed to meet its burden to establish a proper rate.

Instead, Rudolph relied on the Minnesota statutory rate, (A9070 at A9084-A9089), which nearly doubled in 2009 when the law changed from the Treasury Bill rate to 10% annually. *See* Minn. Stat. 549.09. In adopting the 10% interest rate, the district court gave no reason why it used the Minnesota statutory rate in effect in 2009, rather than a rate evidenced by the record. (*See* A433 at A447-A450; *see also Hockerson-Halberstadt, Inc. v. Propet USA, Inc.*, 62 F. App'x. 322, 334 (Fed. Cir. 2003)). Proper prejudgment interest is limited to an amount to “compensate the successful plaintiff for being deprived of compensation for the loss from the time between the ascertainment of the damages and the payment by the defendant.” *Kaiser Aluminum & Chem. Corp. v. Bonjorno*, 494 U.S. 827, 835-36 (1990) (emphasis added). The district court, however, picked a rate that served no compensatory purpose. Camtek’s own borrowing rates were substantially lower than 10%. (A9394 at A9423-A9424 (citing A9710-A9728, A9746-A9766); A9433 (¶¶1-3); A9435-A9438.) In fact, the 10% rate was awarded for a time when interest rates reached all-time lows. (A9394 at A9423-A9424 (citing A9767-A9785).) The district court’s award of prejudgment interest absent any adequate analysis or factual findings was an abuse of discretion. *See Oiness*, 88 F.3d at 1033.

Third, while relying on Minnesota statutory rates to inflate the prejudgment interest rate, the district court failed to apply the aspects of Eighth Circuit law that

do control—namely, the determination of the cutoff date for prejudgment interest. (See A433 at A447-A450; *Transmatic, Inc. v. Gulton Indus., Inc.*, 180 F.3d 1343, 1348 (Fed. Cir. 1999) (regional circuit law is applied to determine interest and date of accrual). In the Eighth Circuit, post-judgment interest is calculated from the date on which the original judgment was entered in the initial trial court proceeding, and not the date of subsequent affirmance of the judgment. See *HJ Inc. v. Flygt Corp.*, 925 F.2d 257, 261-62 (8th Cir. 1991). Thus, to the degree the district court found the damages award was not affected by the *Camtek I* decision from this Court, the original award ascertained the judgment and post-judgment interest—not prejudgment interest—should be awarded from the date of entry of the original judgment. See *id.* at 262. As a result of the district court’s selective application of controlling precedent, it erroneously awarded over \$3.5 million in extra prejudgment interest (applying Minnesota’s statutory rates).⁷

Fourth, for the majority of the accused Falcon sales, the district court further erred by calculating prejudgment interest not as of the date of each infringing sale

⁷ Compare A433 at A456 (fn.7) (multiplying the number of days from the August 28, 2009 judgment until the February 9, 2015 judgment by the district court’s \$1,828.22 per-diem number) with A9792 at A9792-A9794, A9800-A9802 (calculating total interest on both the sales considered by the jury and the supplemental damages award at the Treasury Bill rate from August 29, 2009 to June 9, 2014 as \$71,442.00).

but, instead, as of the date that Rudolph allegedly put Camtek on notice of infringement—February 1, 2005. *See Gen. Motors*, 461 U.S. at 655-56; (A433 at A449 (fn.4).) For this reason, too, the interest award should be reversed. *See Oiness*, 88 F.3d at 1033 (prejudgment interest should only compensate patent owner for “use of its money between the date of injury and the date of judgment”). Making matters worse, the district court then applied the 10% interest rate for the entire period—even though the Minnesota statutory rate was significantly less from February 1, 2005 to July 31, 2009.⁸ (A9701 (showing 4%-5% interest rates from 2005-2009).)

Applying the flawed methodology for the Falcon sales addressed at the 2009 trial, the district court arrived at prejudgment interest in the amount of \$6,693,113.42: the product of the 3,661 days (between February 1, 2005 and the date of its February 9, 2015 order) and \$1,828.22 (the district court’s calculated per-diem interest on all pre-2009 trial sales at a 10% interest rate). (A433 at A449 (fn.4), A456 (fn.7).) Even Rudolph and its expert did not ask for this method of calculation, instead seeking over \$1.8 million *less* in prejudgment interest. (A9070

⁸ The district court inconsistently applied its flawed method of interest calculation. For the sales underlying the supplemental damages award, the district court approximated the date of infringement for those sales rather than backdating the sales to the date of first notice. (A433 at A456-A457.)

at A9086, A9089; A9229 at A9245 (§§13-15), A9266.) Rudolph recognized that no interest could accrue until there was infringement, and there was no alleged infringement until each sale occurred. (A9070 at A9086, A9089; A9229 at A9233, A9268, A9245 (§§13-15), A9266.) Consistent with Rudolph's understanding, for each allegedly infringing Falcon sale, Rudolph's damages expert only calculated interest beginning on the date each sale. (A9070 at A9086, A9089; A9229 at A9233, A9268, A9245 (§§13-15), A9266.) And, Rudolph's expert applied the Minnesota statutory interest rate in effect at the time of each sale—not the 10% rate only in effect from August 1, 2009 to present. (A9229 at A9233, A9268, A9245 (§§13-15).) Thus, at a minimum, the district court performed the wrong calculations, and its prejudgment interest award should be vacated.

CONCLUSION

The infringement judgment should be reversed because the district court found infringement based on incorrect claim constructions. Because Rudolph failed to raise a genuine issue of fact under the proper constructions, judgment of no infringement should be entered. In the alternative, the infringement judgment should be vacated and remanded for a new infringement trial, with instructions to the district court to apply the proper claim constructions for all claim terms.

If the infringement judgment is reversed or vacated or judgment of no infringement is entered, the damages, injunctive relief, and interest judgments

should be vacated. And if the infringement judgment is altered or vacated and remanded, the district court should be instructed to conduct new damages, injunction, and interest proceedings on remand, accounting for the proper claim scope and procedure.

Even on the current record, the damages judgment should also be reversed. In the alternative, the damages judgment should be vacated and remanded for a new damages trial. Additionally, the interest judgment should also be reversed or alternatively remanded, with instructions to evaluate the proper rate and apply the proper calculation method.

Finally, the injunction should be reversed or, in the alternative, vacated and remanded with instructions to the district court to consider claim scope.

Respectfully submitted,

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ADDENDUM

Appendix Range	Title
A476 – A497	United States Patent 6,826,298
A247 – A255	DKT. #547 - ORDER ON FINAL JUDGMENT AND INJUNCTIVE RELIEF. Signed by Chief Judge Michael J. Davis on 8/28/09. (GRR) (Entered: 08/28/2009)
A245 – A246 A532	DKT. #548 – JUDGMENT & Civil Notice re Appeal (jam) (Entered: 08/28/2009)
A256 – A275	DKT. #644 - MEMORANDUM OF LAW & ORDER. Based on the files, records, and proceedings herein IT IS HEREBY ORDERED THAT: 1. Camtek's Motion for Judgment as a Matter of Law of No Literal Infringement of U.S. Patent No. 6,926,298 or, in the Alternative, for a New Trial on Literal Infringement 551 is DENIED. 2. Camtek's Motion for Judgment as a Matter of Law of No Lost Profits and a New Trial or Remittitur Regarding Reasonable Royalty 556 is DENIED. 3. Camtek's Motion for Judgment as a Matter of Law That the Asserted Claims of the '6,298 Patent are Invalid for Obviousness, or, in the Alternative, for a New Trial 561 is DENIED. 4. Camtek's Rule 60 Motion for Clarification of the Order on Final Judgment and Injunctive Relief 601 is DENIED. 5. Camtek's Motion to Stay Enforcement of the Judgment 566 is DENIED AS MOOT. 6. August's Motion for Attorneys Fees 572 is TERMINATED. (Written Opinion). Signed by Chief Judge Michael J. Davis on 7/25/10. (GRR) (Entered: 07/27/2010)
A322 – A323	DKT. #707 - ORDER. Accordingly, based upon the files, records, and proceedings herein, IT IS HEREBY ORDERED that: 1. The Court ADOPTS the Magistrate Judge's Report and Recommendation dated November 17, 2010 683 . 2. Plaintiff's Brief in Support of Request for Supplemental Damages 627 is GRANTED IN PART and DENIED IN PART as follows: a. Plaintiff is awarded supplemental damages in the amount of \$645,946; b. Plaintiff is granted leave to bring such additional motions for supplemental damages as are supported by Plaintiff's post-verdict discovery; and c. Plaintiff's motion is denied in all other respects. (Written Opinion). Signed by Chief Judge Michael J. Davis on 1/7/11. (GRR) (Entered: 01/07/2011)
A312 – A321	DKT. #683 - REPORT AND RECOMMENDATION re 627 Brief filed by August Technology Corporation. Objections to R&R due by 12/2/2010. Signed by Chief Mag. Judge Arthur J. Boylan on 11/17/2010. (LMB) (Entered: 11/17/2010)
A324 – A334	DKT. #731 - REPORT AND RECOMMENDATION: 1. Plaintiffs Motion For Contempt [Docket No. 715] be granted. 2. Defendant be ordered to pay plaintiffs \$1,291,892, reflecting double damages, as a sanction for contempt. 3. Plaintiffs be awarded award of attorneys fees and costs in an amount to be determined by the court, reflecting fees incurred in bringing the instant motion for contempt. Objections to R&R due by 9/1/2011. Signed by Chief Mag. Judge Arthur J. Boylan on 08/11/2011. (lmb) (Entered: 08/11/2011)
A335 – A345	DKT. #732 - ORDER denying 709 Motion for Enhanced Damages. Signed by Chief Mag. Judge Arthur J. Boylan on 08/11/2011. (lmb) (Entered: 08/11/2011)

Appendix Range	Title
A346 – A353	DKT. #764 - MEMORANDUM OF LAW & ORDER. IT IS HEREBY ORDERED: 1. The Court ADOPTS Magistrate Judge Arthur J. Boylan's Report and Recommendation dated August 11, 2011 731 ; 2. Plaintiffs' Motion for Contempt 715 is GRANTED; 3. Defendant is ordered to pay Plaintiffs \$1,291,892 as a sanction for contempt; 4. Plaintiffs are awarded reasonable attorney fees and costs incurred in bringing their Motion for Contempt; 5. this matter is referred to Magistrate Judge Franklin L. Noel for determination of reasonable attorney fees; and 6. Defendant's Motion to Set Aside the Magistrate Judge's Finding of Willful Infringement 750 is DENIED. (Written Opinion). Signed by Chief Judge Michael J. Davis on 3/26/12. (GRR) (Entered: 03/26/2012)
A357 – A358	DKT. #794 – SCHEDULING ORDER: (Motions (non-disp) due 5/1/2012, Motions (disp) due by 7/1/2012, Ready for trial due by 10/1/2012). Signed by Magistrate Judge Franklin L. Noel on 4/25/12. (akl) (Entered: 04/25/2012)
A361 – A364	DKT. #816 - ORDER denying 798 Motion to Enforce the Court's Scheduling Order and to Bifurcate and Set Schedule for Proceedings Addressing Remedies. Signed by Magistrate Judge Franklin L. Noel on 6/25/12. (akl) (Entered: 06/26/2012)
A365 – A375	DKT. #913 - MEMORANDUM OPINION AND ORDER 1. Camtek Ltd's 780 Rule 60 Motion for Relief from Contempt Order and Sanctions Award is granted in part and denied in part, as follows: a. The motion is granted in part with respect to sanctions. Camtek, Ltd. is relieved of the previous 764 order to pay double damages and. is ordered to pay Plaintiffs \$645,946 in lost profits, as a sanction for contempt. b. The motion is denied in all other respects. 2. Camtek Ltd's 790 Rule 60 and Rule 59 Motion for Relief from Order Relating to Willfulness is DENIED. 3. Camtek Ltd.'s 797 Objections to the Magistrate Judge's Award of Fees and Costs are overruled as moot, and the Court affirms the Magistrate Judge's 795 May 1, 2012 Order. (Written Opinion). Signed by Judge John R. Tunheim on August 17, 2012.
A376 – A377	DKT. #914 – JUDGMENT (lmb) (Entered: 08/30/2012) (Attachment: Civil Notice of Appeal)
A378 – A379	DKT. #959 – ORDER denying 858 Motion to Enforce the Courts Scheduling Order and Block Any Reliance on Darren James. Signed by Magistrate Judge Franklin L. Noel on 1/24/13. (akl) (Entered: 01/24/2013)
A380 – A425	DKT. #964 - MEMORANDUM OPINION AND ORDER denying 818 Defendant's Motion to Exclude Expert Testimony and report of Frances McCloskey; denying 823 Defendant's Motion for Claim Construction; denying 823 Defendant's Motion for Summary Judgment of Non-infringement; denying 828 Defendant's Motion to Exclude Expert Testimony and report of Joseph Mundy; granting 832 Plaintiffs' Motion for Summary Judgment of Infringement; denying as moot 840 Plaintiffs' Motion to Exclude Expert Testimony and report of John Phillip Mellor(Written Opinion). Signed by Judge John R. Tunheim on March 31, 2014. (HAZ) CC: Counsel of record.

Appendix Range	Title
A426 – A427	DKT. #990 - ORDER 1. The parties shall follow the dispositive motion briefing schedule with respect to 981 Plaintiffs' Motion for Permanent Injunction and Final Judgment. 2. With the exception of the briefing allowed regarding Docket No. 981, the parties are prohibited from filing further documents or motions in this case without receiving prior permission from the Court, until further order of the Court. Signed by Judge John R. Tunheim on May 27, 2014. (DML) (Entered: 05/27/2014)
A428 – A429	DKT. #1003 - TEXT ONLY ENTRY: NOTICE to Attorney: Camtek Ltd's request to file a motion to strike Rudolph Technologies, Inc's Reply Brief is DENIED. (HAZ) (Entered: 07/10/2014)
A430 – A432	DKT. #1004 - ORDER vacating 816 Order on Motion to Bifurcate, and denying 915 Objection, filed by Rudolph Technologies, Inc., August Technology Corporation, and 855 Objection, filed by Camtek, Ltd as moot. The Court will consider the issue of a new trial on damages in light of the parties' most recent submissions related to the motions pending at Docket Nos. 966 and 981. Signed by Judge John R. Tunheim on September 5, 2014. (HAZ) (Entered: 09/08/2014)
A433 – A459	DKT. #1010 - MEMORANDUM OPINION AND ORDER denying defendant's 966 Motion for New Proceedings and Jury Trial; granting in part and denying in part plaintiffs' 981 Motion for Final Judgment and Permanent Injunction (Written Opinion). Signed by Judge John R. Tunheim on February 9, 2015. (DML) (Entered: 02/09/2015)
A460 – A463 A533	DKT. #1011 – JUDGMENT & Civil Notice re Appeal (las) Modified text on 2/10/2015 (lmb). (Entered: 02/10/2015)



US006826298B1

(12) **United States Patent**
O'Dell et al.

(10) Patent No.: **US 6,826,298 B1**
(45) Date of Patent: ***Nov. 30, 2004**

(54) **AUTOMATED WAFER DEFECT INSPECTION SYSTEM AND A PROCESS OF PERFORMING SUCH INSPECTION**

(75) Inventors: **Jeffrey O'Dell**, Deephaven, MN (US);
Thomas Verburgt, Eden Prairie, MN (US);
Mark Harless, New Hope, MN (US);
Cory Watkins, Ramsey, MN (US)

(73) Assignee: **August Technology Corp.**,
Bloomington, MN (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/562,273**

(22) Filed: **Apr. 29, 2000**

Related U.S. Application Data

(63) Continuation of application No. 09/352,564, filed on Jul. 13, 1999, now Pat. No. 6,324,298.

(60) Provisional application No. 60/092,923, filed on Jul. 15, 1998, and provisional application No. 60/092,701, filed on Jul. 14, 1998.

(51) Int. Cl.⁷ **G06K 9/00**

(52) U.S. Cl. **382/149; 250/559.39**

(58) Field of Search **382/141, 145, 382/147, 148, 149, 181; 348/87, 126; 356/237.3, 237.4, 237.5; 250/559.04, 559.41, 559.42, 559.43, 559.46, 559.45, 559.05, 559.06, 559.08, 559.39, 559.4, 548; 438/16**

(56) References Cited

U.S. PATENT DOCUMENTS

4,328,553 A	5/1982	Fredriksen et al.	356/139.04
4,464,705 A	8/1984	Horowitz	362/12
4,644,172 A *	2/1987	Sandland et al.	250/548
4,823,394 A	4/1989	Berkin et al.	382/145
5,091,963 A	2/1992	Lit et al.	382/149
5,497,381 A	3/1996	O'Donoghue et al.	714/745
5,640,200 A	6/1997	Michael	348/87
5,641,960 A	6/1997	Okubo et al.	250/310
5,787,190 A	7/1998	Peng et al.	382/145
5,822,055 A	10/1998	Tsai et al.	356/237.1
5,850,466 A	12/1998	Schott	382/141
5,856,844 A	1/1999	Batterman et al.	348/207.99
5,917,588 A *	6/1999	Addiego	356/237.2
5,949,901 A	9/1999	Nichani et al.	382/149
6,324,298 B1	11/2001	O'Dell et al.	382/149

* cited by examiner

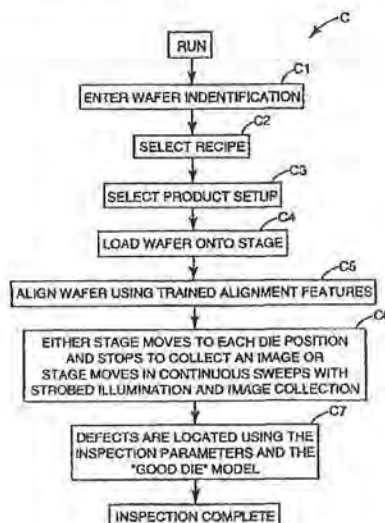
Primary Examiner—Samir Ahmed

(74) Attorney, Agent, or Firm—John Vasuta, Esq.; Dicke, Billig & Czaja, PLLC

(57) ABSTRACT

An automated defect inspection system has been invented and is used on patterned wafers, whole wafers, broken wafers, partial wafers, sawn wafers such as on film frames, JEDEC trays, Auer boats, die in gel or wafer packs, MCMS, etc. and is specifically intended and designed for second optical wafer inspection, for such defects as metalization defects (such as scratches, voids, corrosion, and bridging), diffusion defects, passivation layer defects, scribing defects, glassivation defects, chips and cracks from sawing, solder bump defects, and bond pad area defects.

5 Claims, 19 Drawing Sheets



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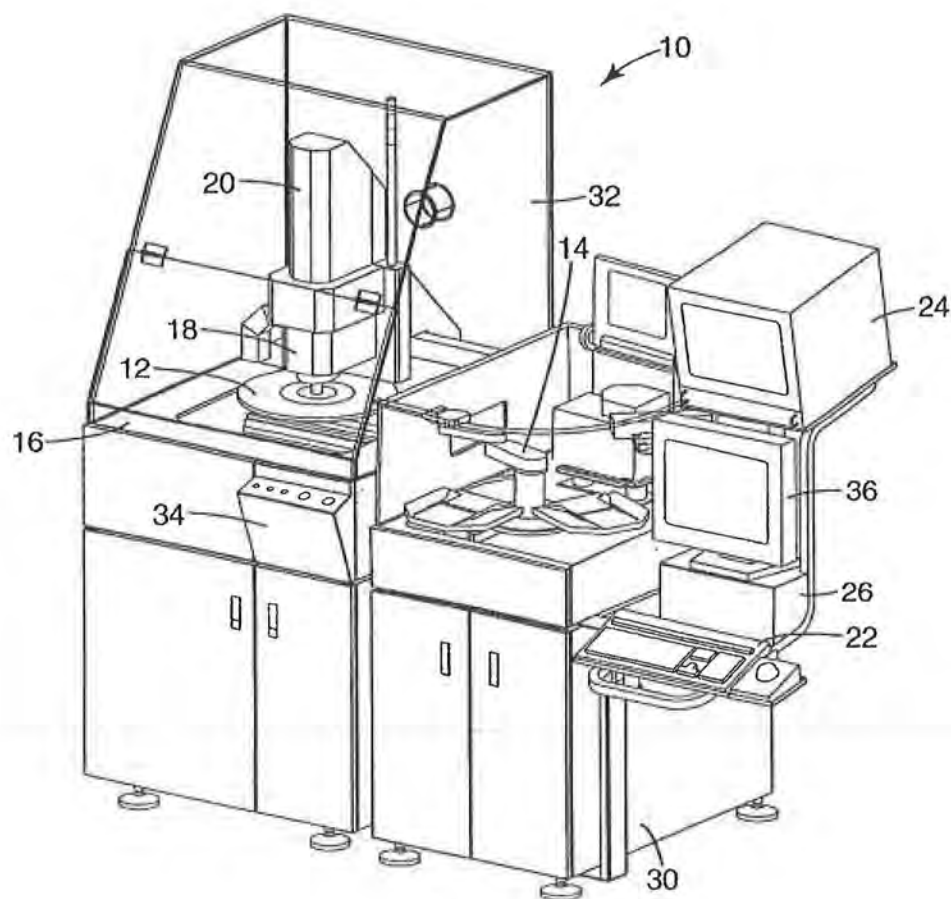


Fig. 1

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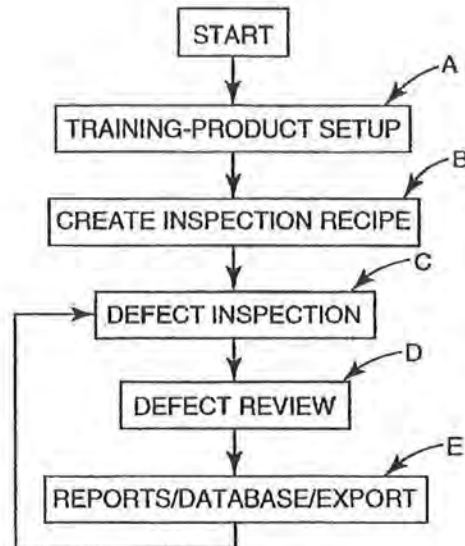


Fig. 2

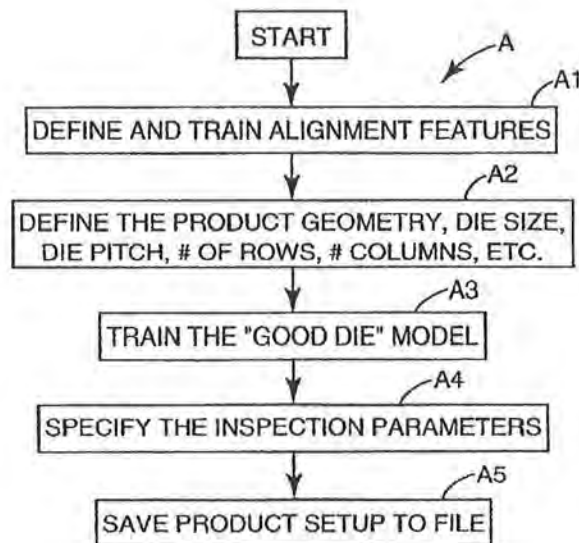


Fig. 3

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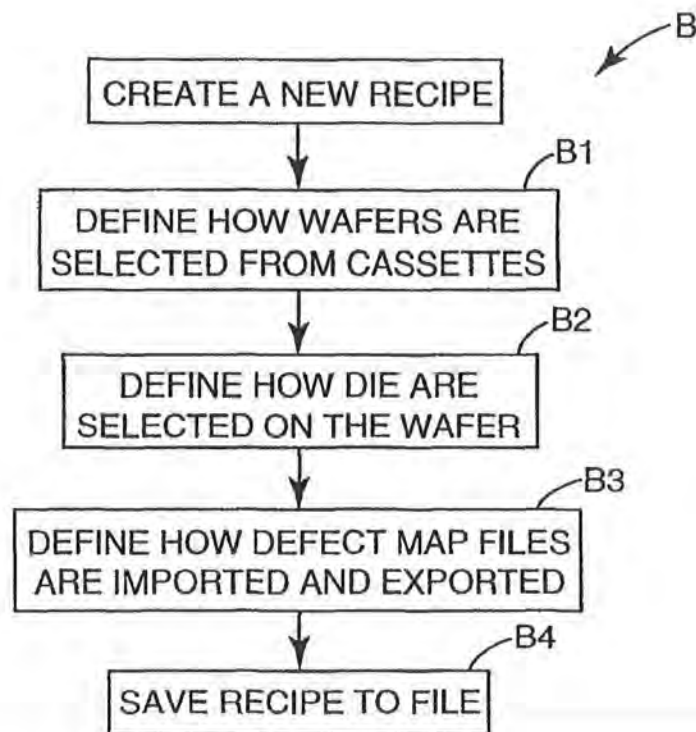


Fig. 4

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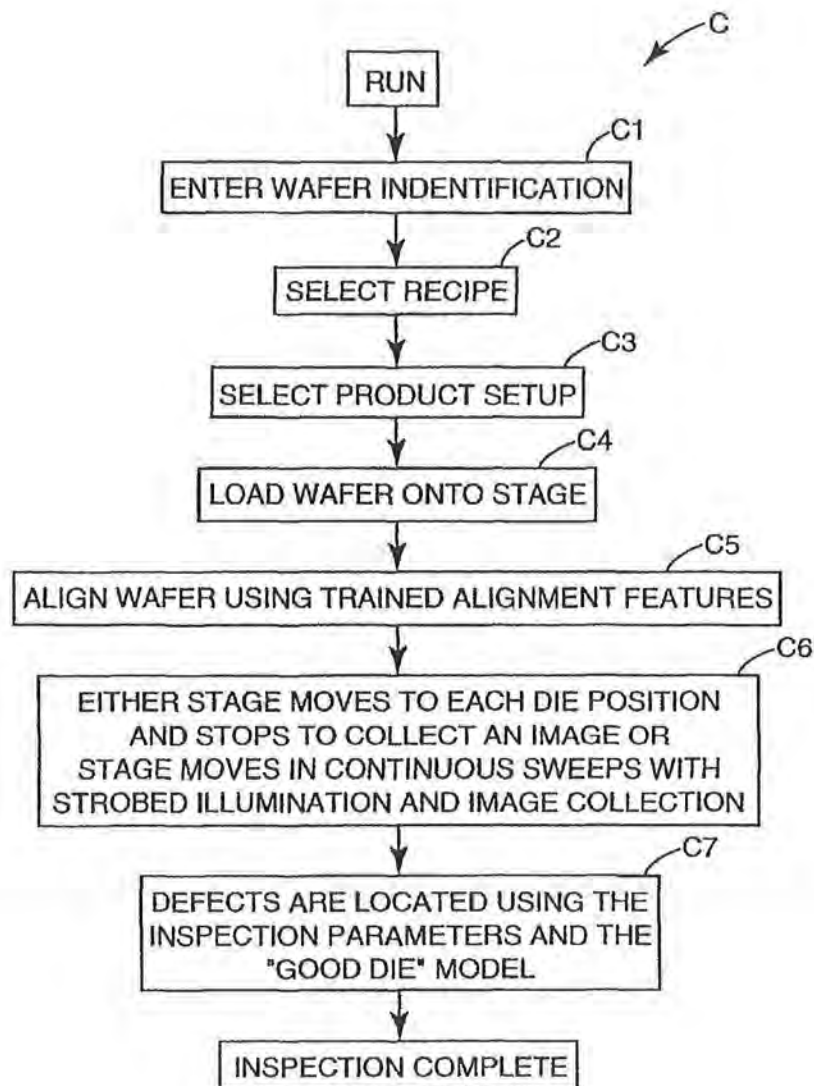


Fig. 5

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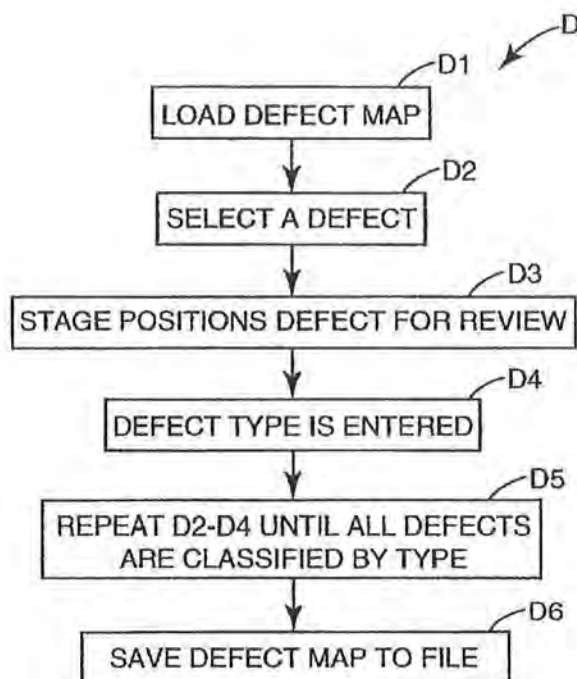


Fig. 6

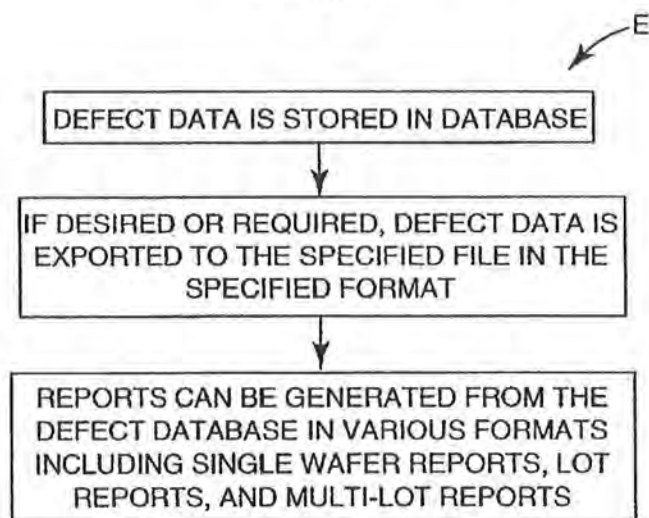


Fig. 7

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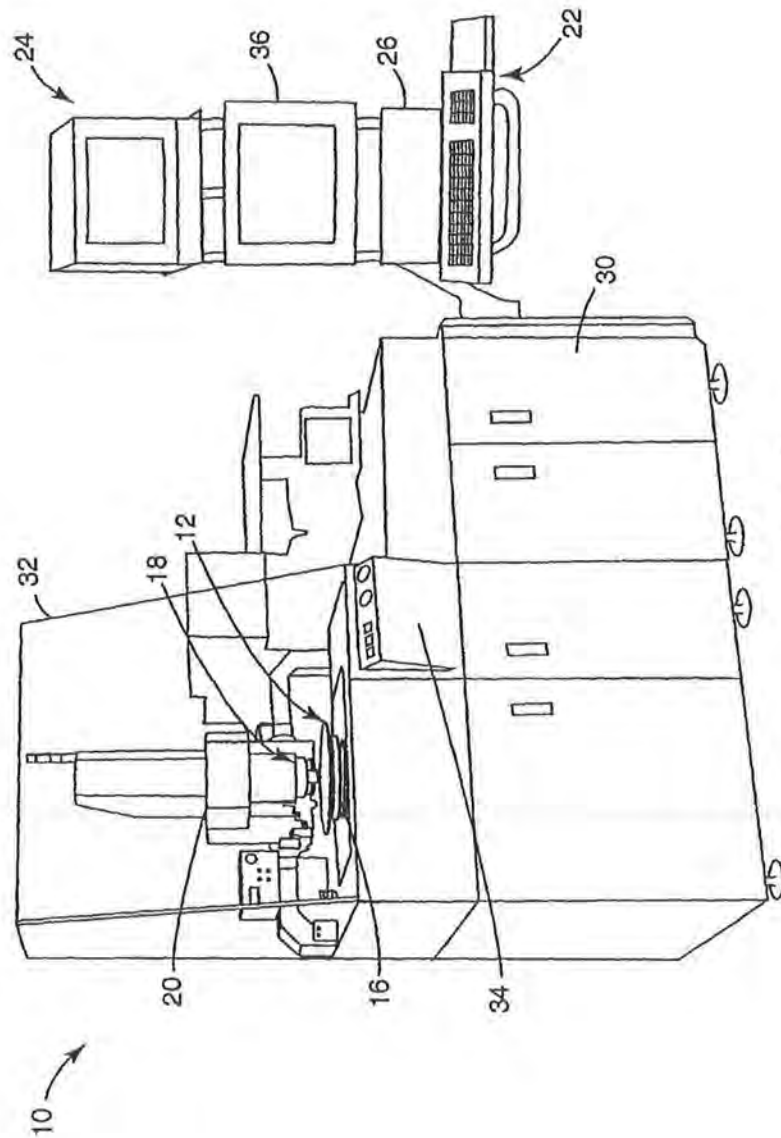


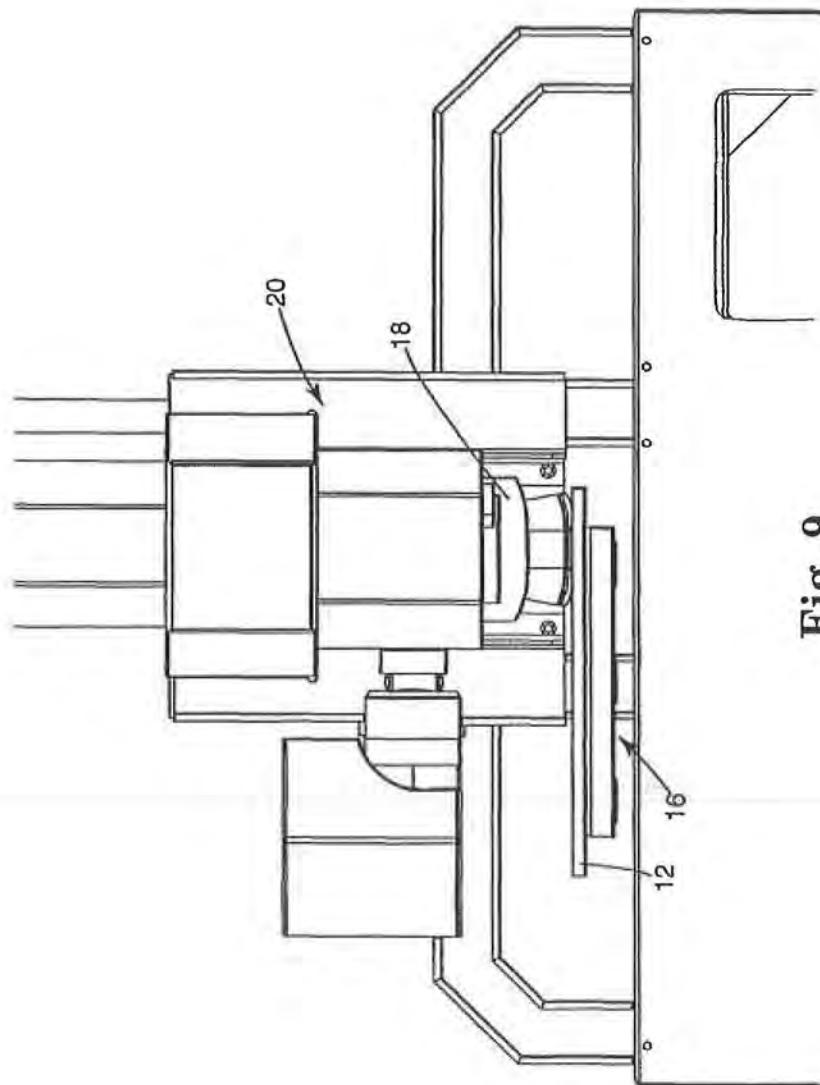
Fig. 8

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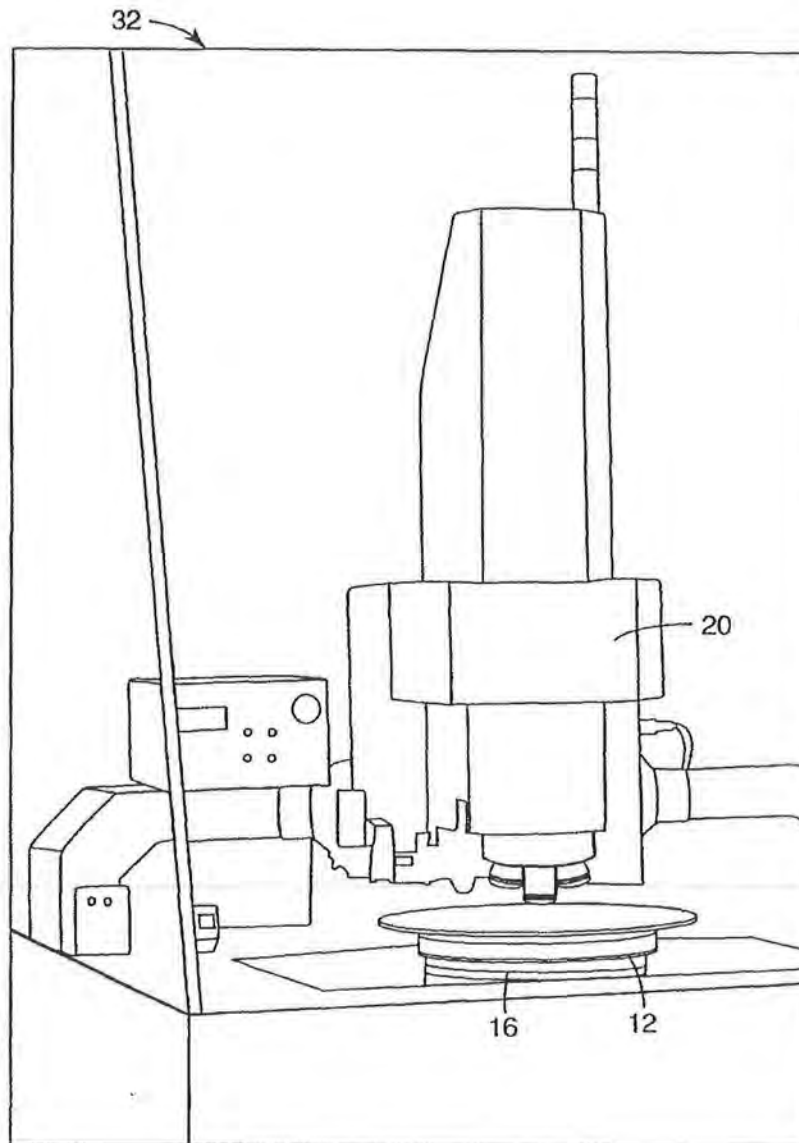


Fig. 10

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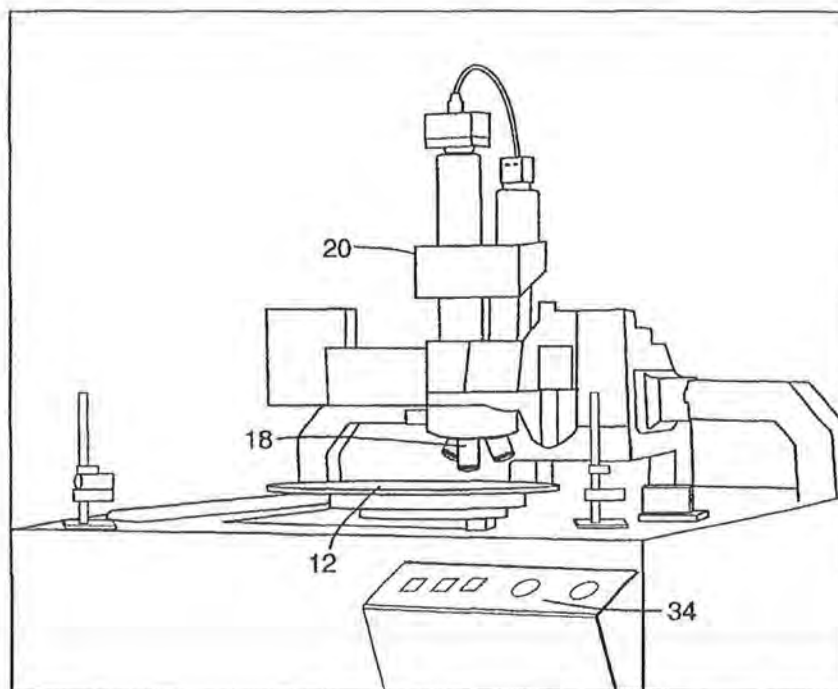


Fig. 11

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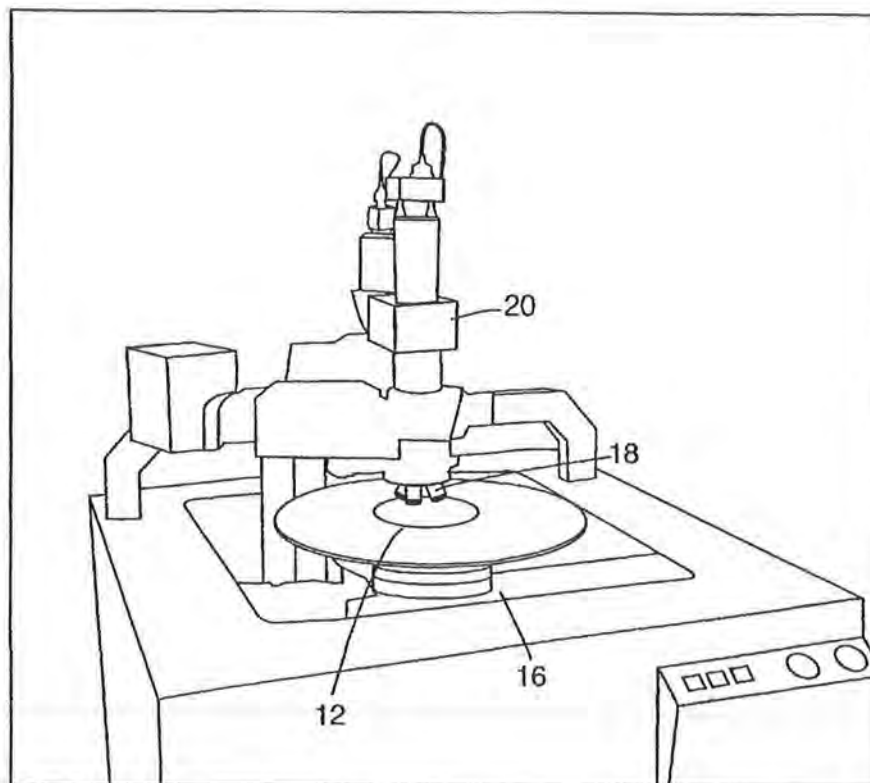


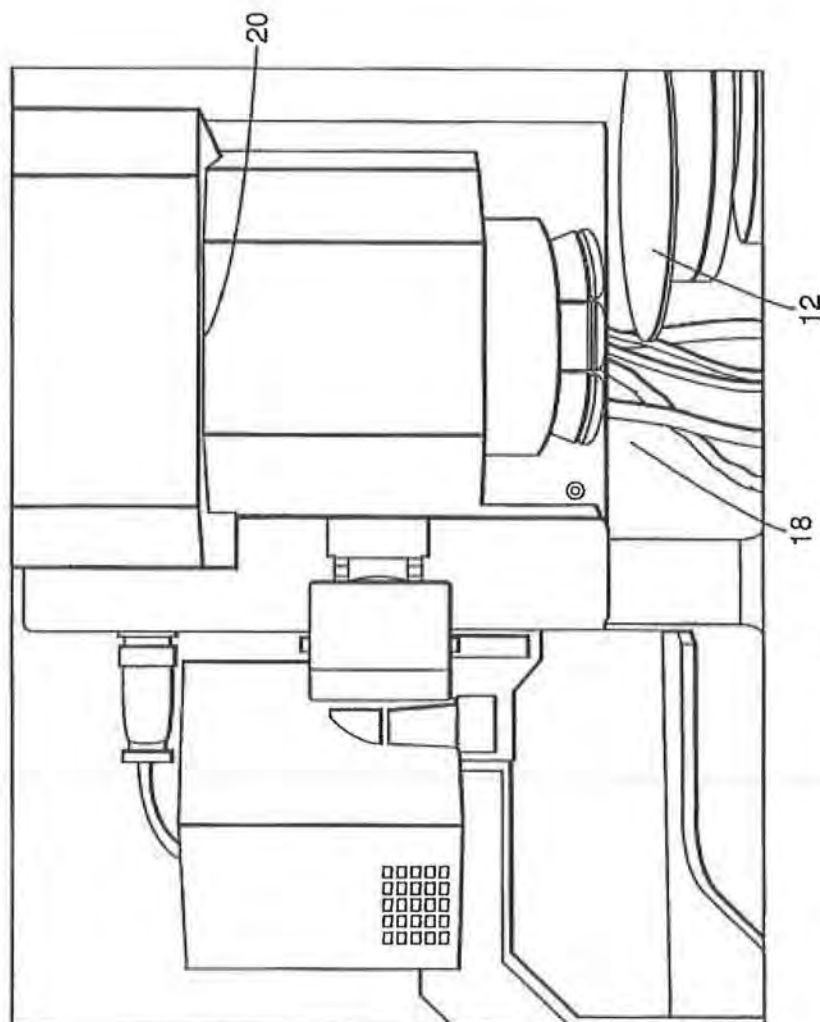
Fig. 12

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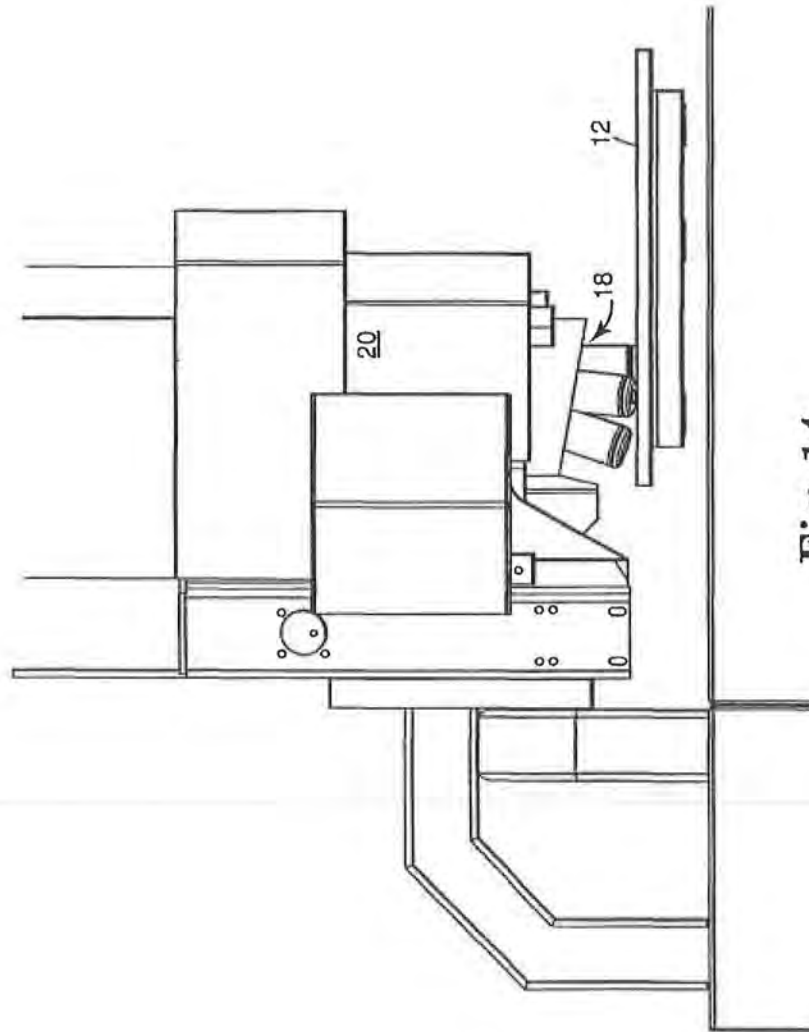


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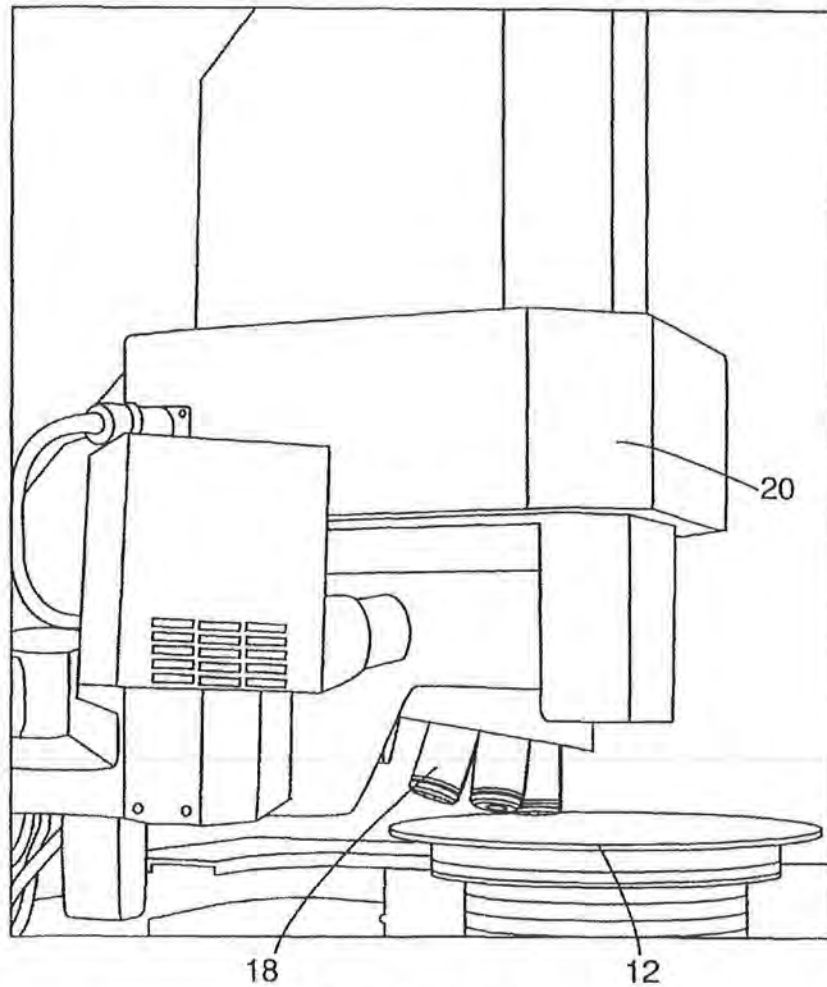


Fig. 15

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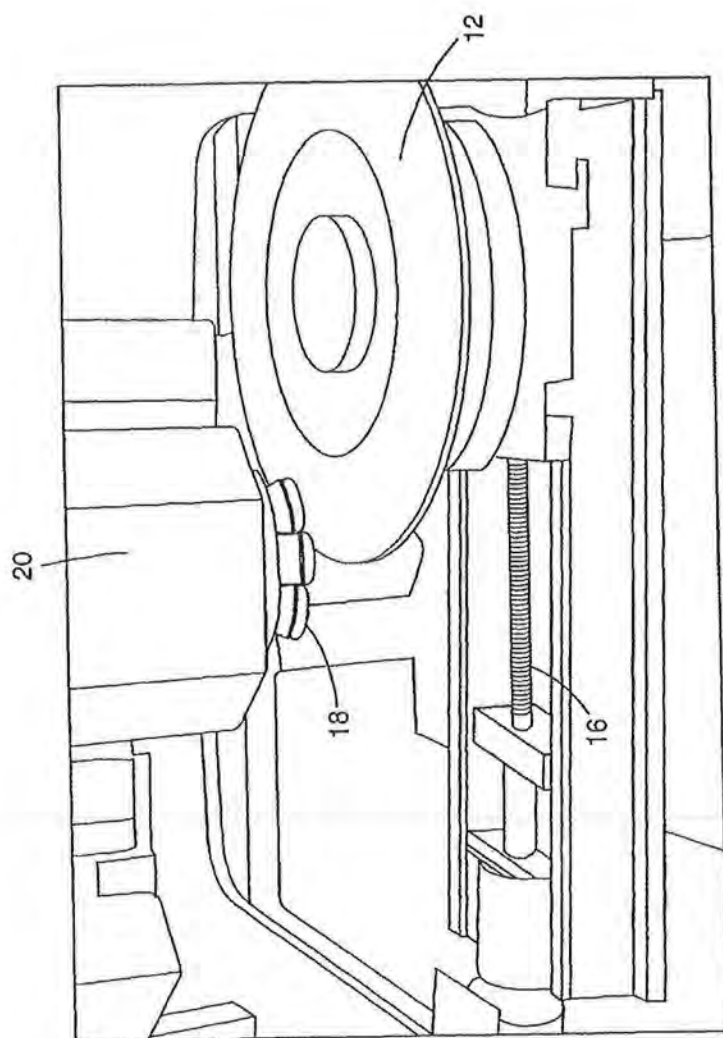


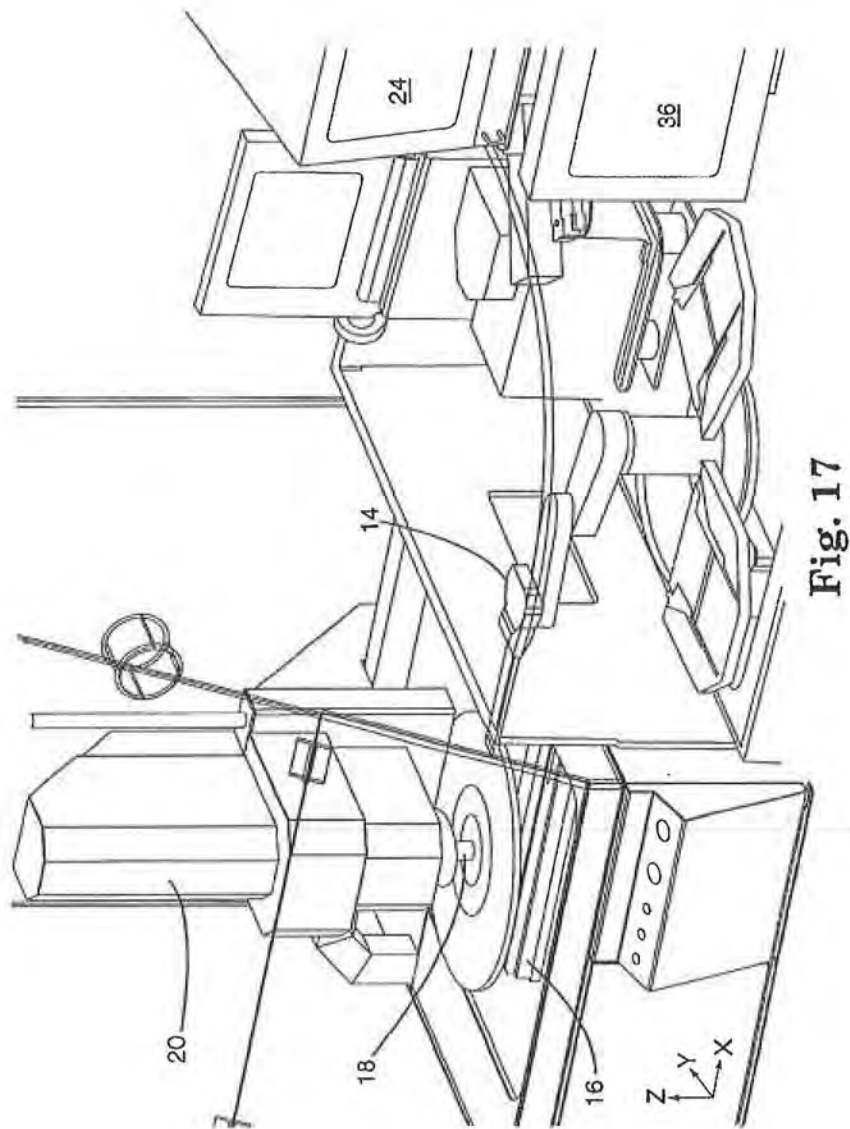
Fig. 16

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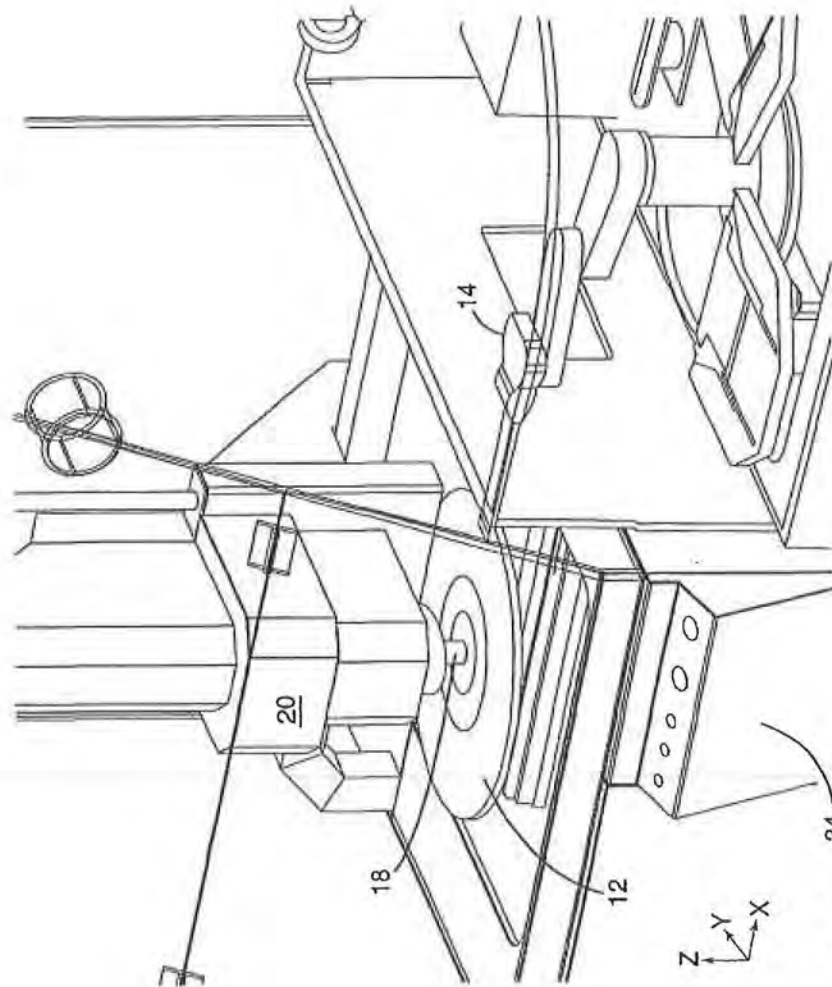


Fig. 18

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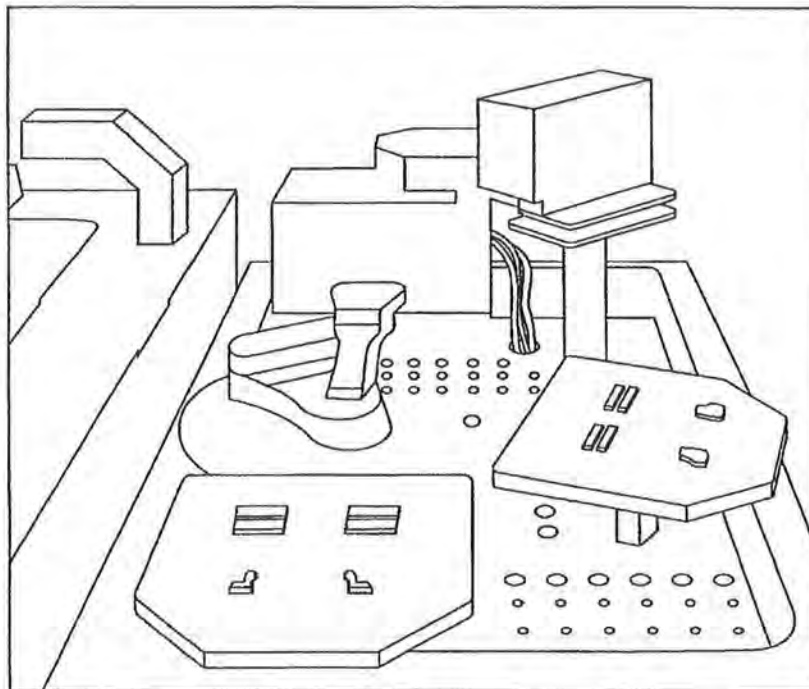


Fig. 19

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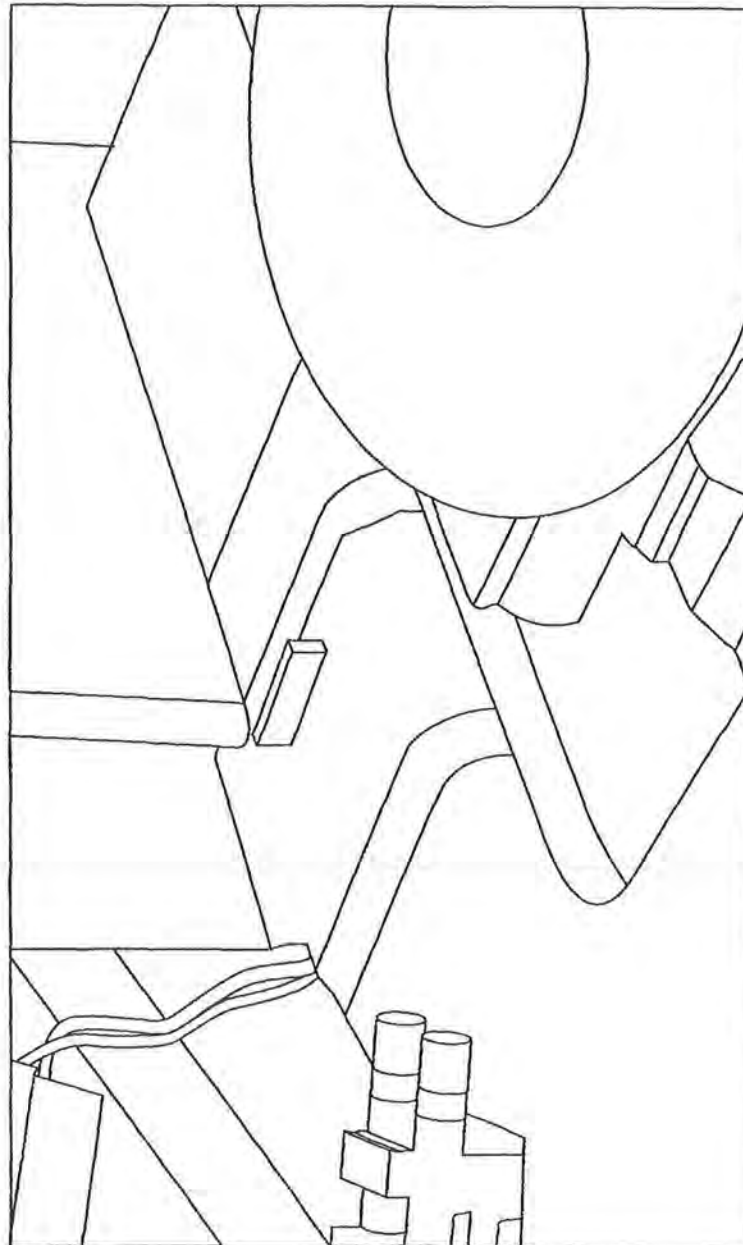


Fig. 20

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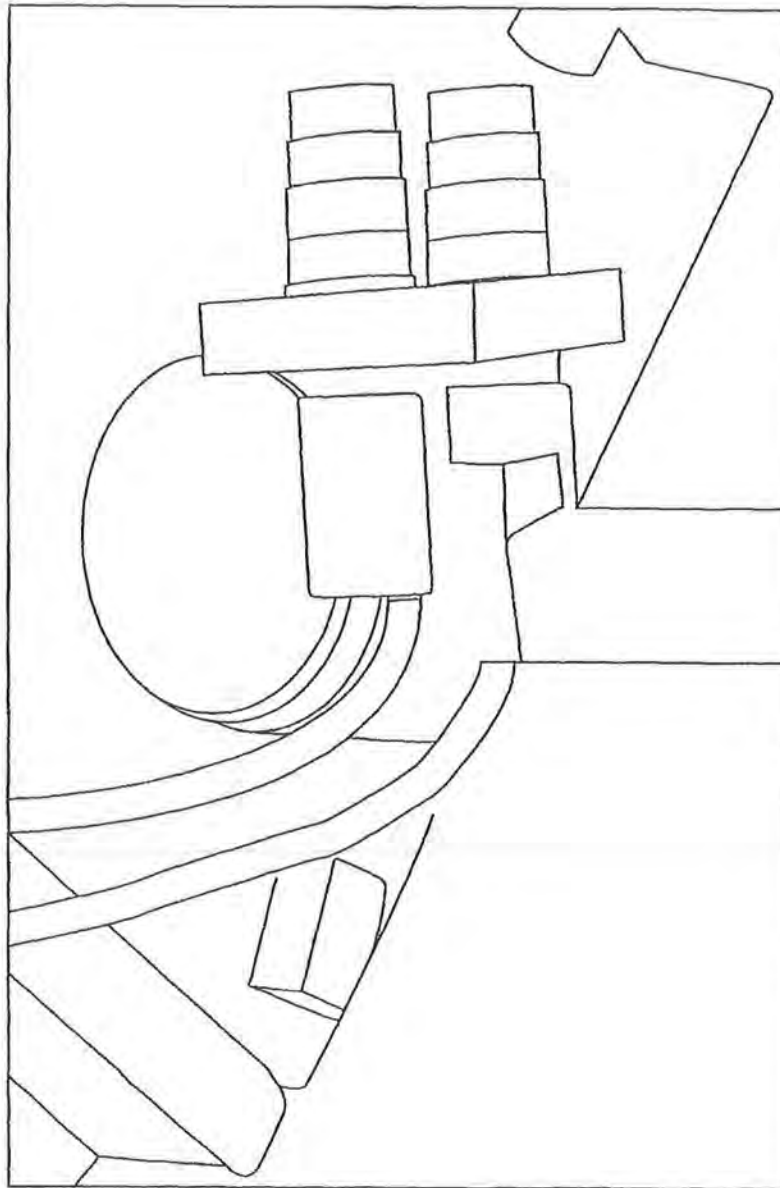


Fig. 21

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AUTOMATED WAFER DEFECT INSPECTION SYSTEM AND A PROCESS OF PERFORMING SUCH INSPECTION

REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application Nos. 60/092,923 filed on Jul. 15, 1998 and 60/092,701, filed on Jul. 14, 1998, and a continuation of U.S. patent application No. 09/352,564, filed on Jul. 13, 1999, now U.S. Pat. No. 6,324,298 B1, issued Nov. 27, 2001.

BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to defect inspection systems for the semiconductor industry. More particularly, the present invention relates to an automated defect inspection system for patterned wafers, whole wafers, sawn wafers such as on film frames, JEDEC trays, Auer boats, die in gel or wafer packs, multi-chip modules often referred to as MCMs, etc. that is specifically intended and designed for second optical wafer inspection for such defects as metalization defects (such as scratches, voids, corrosion, and bridging), diffusion defects, passivation layer defects, scribing defects, glassivation defects, chips and cracks from sawing, and bump or bond pad area defects such as gold or solder bump defects or similar interconnect defects. Specifically, the present invention is an automated defect inspection system for integrated circuits, LCD panels with photolithography circuitry embedded therein, etc. where the system is used as follows: the system is trained by viewing a plurality of known good die under an imaging head resulting in a good die model, an inspection recipe is inputted into the system to define inspection parameters, defect inspection occurs where die are loaded onto, aligned in and viewed by an imaging head for defects in comparison to the good die model, an optional review of the identified defects may occur, and the user may optionally receive or export a report thereon.

2. Background Information

Over the past several decades, the semiconductor has exponentially grown in use and popularity. The semiconductor has in effect revolutionized society by introducing computers, electronic advances, and generally revolutionizing many previously difficult, expensive and/or time consuming mechanical processes into simplistic and quick electronic processes. This boom in semiconductors has been fueled by an insatiable desire by business and individuals for computers and electronics, and more particularly, faster, more advanced computers and electronics whether it be on an assembly line, on test equipment in a lab, on the personal computer at one's desk, or in the home electronics and toys.

The manufacturers of semiconductors have made vast improvements in end product quality, speed and performance as well as in manufacturing process quality, speed and performance. However, there continues to be demand for faster, more reliable and higher performing semiconductors.

One process that has evolved over the past decade or so is the semiconductor inspection process. The merit in inspecting semiconductors throughout the manufacturing process is obvious in that bad wafers may be removed at the various steps rather than processed to completion only to find out a defect exists either by end inspection or by failure during use.

A typical example of the semiconductor manufacture process is summarized as follows. Bare whole wafers are manufactured. Thereafter, circuitry is created on the bare whole wafers. The whole wafer with circuitry is then sawn

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into smaller pieces known in the industry as die. Thereafter, the die are processed, as is well known in the art, typically as die in wafer and/or gel packs or on substrates.

Today, it is well known that various inspection processes occur during this semiconductor process. Bare wafer inspection may occur on bare whole wafers not long after initial creation from sand and/or after polishing of the wafer but always prior to the deposit of any layers that form the circuitry. Defects being inspected for during bare wafer inspection include surface particulates and surface imperfections or irregularities.

During the deposition of layers, that is the circuit building, on the whole wafer, one or more first optical inspections may occur. First (1st) optical inspection is "in process" inspection of wafers during circuitry creation. This 1st inspection may be after each layer is deposited, at certain less often intervals, or only once during or after all deposits. This 1st optical inspection is usually a sub-micron level inspection in the range of 0.1 micron to <1 micron. This process is used to check for mask alignment or defects such as extra metal, missing metal, contaminants, etc. This 1st inspection occurs during circuitry development on the wafer.

Once the whole wafers are at least fully deposited on, that is all of the circuitry is created thereon, a post 1st (or 1.5) inspection occurs on the fully processed whole wafers. Generally, this is prior to the deposit of a passivation layer although it need not be. In addition, this post 1st inspection is generally prior to electrical testing or probing of the whole wafers. This inspection is typically a 0.5 micron to 1 micron optical inspection.

After the whole wafers are fully processed, one or more 2nd optical inspections are performed. Front end 2nd optical inspections occur after the whole wafers are fully processed and, if probing is necessary, just before or right after this probing or electrical testing to determine the quality of the devices. Back end 2nd optical inspections occur at various stages such as during the applying of bumps to the die or wafer, during or after sawing of the wafers into sawn wafers, during or after dicing of the wafers, during or after picking up and placing of the die onto other packages such as trays or wafer or gel packs, during or after placing of the wafers onto a substrate, etc. This 2nd optical inspection is generally at a 1+ micron level and is generally looking for defects such as metalization defects (such as scratches, voids, corrosion, and bridging), diffusion defects, passivation layer defects, scribing defects, glassivation defects, chips and cracks from sawing, and probe or bond pad area defects.

After actual packaging, 3rd optical inspections occur. This packaging involves at least one of the following: placing the die on a substrate, wire bonding the die, connecting the leads, attaching the balls to a flip chip, etc. At this point, the inspection involves inspecting the ball grid array, lead straightness, wire bonding, ink marking, and for any package defects such as chips, cracks and voids. This 3rd level inspection is generally at a 5+ micron level.

The focus of the semiconductor inspection industry has been bare wafer and 1st optical inspection. Numerous market leaders have developed, patented, and are manufacturing and marketing 1st optical inspection systems to perform these inspections including ADE, KLA, Tencor, Inspec, Applied, Orbit and others.

Often this equipment is very expensive and large. At the 1st inspection stage, this expense and machine size issue is not as significant as at later inspection stages because only a relatively few parties manufacture the silicon wafers and thus need to inspect bare wafers in comparison to the vast number of companies that buy bare or sawn wafers and further process them into finished chips. These often expensive and large inspection devices are not cost justifiable for

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smaller shops and as such, inspection equipment is needed that satisfies this need at the 2nd and 3rd stages as well as is more economical for the vast many smaller companies that finish process wafers.

To a lesser extent, some resources have been spent on 3rd optical inspection and several companies including STI, View Engineering, RVSI, and ICOS have developed systems for this purpose and are marketing those systems.

However, none of these systems address the particular and unique constraints of 2nd optical and this area has been largely ignored. In actual application, 2nd optical inspection has been marginally performed by manual inspection using humans and microscopic equipment. This manual process is inaccurate due to various factors including stress, eye fatigue and boredom of the operator as well as different perceptions by different operators as to the significance of a finding. In addition, smaller circuit geometry and higher throughput requirements are increasing the demands on semiconductor inspection at this 2nd optical level, all of which further results in operator stress, eye fatigue, and sometimes lower quality.

In addition at the 2nd optical inspection stage to the need for inspecting for metalization defects (such as scratches, voids, corrosion, and bridging), diffusion defects, passivation layer defects, scribing defects, glassivation defects, chips and cracks from sawing, etc., bumps have taken on additional importance of recent. This is due to the recent surge in the use of bump interface connects, or flip chips, rather than leads which has magnified the importance of 2nd optical inspection and thus the need for equipment and systems over manual inspection.

OBJECTIVES AND SUMMARY OF THE INVENTION

It is an objective of the present invention to provide an automated inspection system that replaces the current manual inspection process.

It is a further objective of the present invention to provide a new, state of the art 2nd optical inspection system.

It is further an objective of the present invention to provide an automated defect inspection system of patterned wafers, whole wafers, sawn wafers, JEDEC trays, Auer boats, die in gel or wafer packs, MCMS, etc.

It is further an objective of the present invention to provide an automated defect inspection system that is specifically intended and designed for second optical wafer inspection although useful in other levels of optical inspection such as level 1.5.

It is further an objective of the present invention to provide an automated defect inspection system for inspecting for defects such as metalization defects (such as scratches, voids, corrosion, and bridging), diffusion defects, passivation layer defects, scribing defects, glassivation defects, chips and cracks from sawing, probe area defects, bump area defects and/or bond pad area defects.

It is further an objective of the present invention to provide an automated defect inspection system that eliminates or significantly reduces the need for manual microscopic inspecting of every die in every wafer.

It is further an objective of the present invention to provide an automated defect inspection system that views the ever-smaller circuit geometry in an accurate and rapid manner.

It is further an objective of the present invention to provide an automated defect inspection system that provides for higher throughput than manual inspection.

It is further an objective of the present invention to provide an automated defect inspection system that provides for improved inspection quality and consistency.

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It is further an objective of the present invention to provide an automated defect inspection system that provides for improved process control.

It is further an objective of the present invention to provide an automated defect inspection system that has inspection recipes therein and can create, copy and edit such recipes to customize the system to the user's inspection requirements.

It is further an objective of the present invention to provide an automated defect inspection system that uses digital image analysis to perform semiconductor wafer inspection.

It is further an objective of the present invention to provide an automated defect inspection system that is trained by inspecting good die so that once trained the system detects variations from what it has learned.

It is further an objective of the present invention to provide an automated defect inspection system that is trainable.

It is further an objective of the present invention to provide an automated defect inspection system that develops a model of a good die and uses this model to inspect unknown quality die.

It is further an objective of the present invention to provide an automated defect inspection system that includes a "good die" training step and a defect inspection step using the good die model.

It is further an objective of the present invention to provide an automated defect inspection system that includes a "good die" training step, an inspection recipe creation step and a defect inspection step.

It is further an objective of the present invention to provide an automated defect inspection system that includes a "good die" training step, an inspection recipe creation step, a defect review step, and a report issuing or exporting step.

It is further an objective of the present invention to provide an automated defect inspection system that provides for multi-dimensional alignment of each wafer, substrate or other device having die thereon to be inspected such that every die is uniformly positioned.

It is further an objective of the present invention to provide an automated defect inspection system that provides for x, y and theta (θ) alignment of each wafer, substrate or other device having die thereon to be inspected such that every die is uniformly positioned.

It is further an objective of the present invention to provide an automated defect inspection system that provides for coarse alignment, fine alignment, and/or focusing of each wafer.

It is further an objective of the present invention to provide an automated defect inspection system that provides "die" modeling by viewing multiple good dies and developing a model therefrom.

It is further an objective of the present invention to provide an automated defect inspection system that provides for defect inspection using an imaging head or camera to view static and properly aligned die.

It is further an objective of the present invention to provide an automated defect inspection system that provides for defect inspection using an imaging head or camera to view dynamic or moving yet properly aligned die.

It is further an objective of the present invention to provide an automated defect inspection system that provides for defect inspection using an imaging head, or camera to view dynamic or moving yet properly aligned die where a strobe illumination is used to capture still views of the dynamically moving die.

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It is further an objective of the present invention to provide an automated defect inspection system that provides for review of the system detected defects whereby the user need not look at all die or all parts of die and instead only views the marked or noted defects.

It is further an objective of the present invention to provide an automated defect inspection system that provides means for accounting for drifting or non-regularity of die positioning or spacing.

It is further an objective of the present invention to provide an automated defect inspection system that provides means to inspect die on a stretched film frame where the dies are irregularly spaced, rotated, drifted, etc.

It is further an objective of the present invention to provide an automated defect inspection system that provides a method to measure the size, position, shape, geometry, and other characteristics of solder bumps, gold bumps, bond pads, or the like.

It is further an objective of the present invention to provide an automated defect inspection system that provides a method to inspect the quality of gold bumps, solder bumps, interconnects or the like, or the probe marks on bond pads.

It is further an objective of the present invention to provide an automated defect inspection system that provides a method to detect defects on bond pads, bumps or interconnects.

Still other advantages and benefits of the invention will become apparent to those skilled in the art upon a reading and understanding of the following summary and detailed description.

Accordingly, the present invention satisfies these and other objectives as it relates to automated inspection equipment, systems and processes. Specifically, the present invention is an automated method of inspecting a semiconductor wafer in any form, size and shape including whole patterned wafers, sawn wafers, broken wafers, partial wafers, and wafers of any kind on film frames, dies, die in gel paks, die in wafer paks, multi-chip modules often called MCMs, JEDEC trays, Auer boats, and other wafer and die package configurations for defects, the method or apparatus comprising training a model as to parameters of a good wafer via optical viewing of multiple known good wafers, illuminating unknown quality wafers using at least one of a brightfield illuminator positioned approximately above, a darkfield illuminator positioned approximately above, and a darkfield laser positioned approximately about the periphery of a wafer test plate on which the wafer is inspected, all of which are for providing illumination to the unknown quality wafers during inspection and at least one of which strobes during inspection, and inspecting unknown quality wafers using the model.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiment of the invention, illustrative of the best mode in which applicant has contemplated applying the principles, are set forth in the following description and are shown in the drawings and are particularly and distinctly pointed out and set forth in the appended claims.

FIG. 1 is a perspective view of one embodiment of the system;

FIG. 2 is an overall flow chart of the process;

FIG. 3 is a more detailed flow chart of one step in the process as shown in FIG. 2;

FIG. 4 is a more detailed flow chart of one step in the process as shown in FIG. 2;

FIG. 5 is a more detailed flow chart of one step in the process as shown in FIG. 2;

FIG. 6 is a more detailed flow chart of one step in the process as shown in FIG. 2;

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FIG. 7 is a more detailed flow chart of one step in the process as shown in FIG. 2;

FIG. 8 is an overall perspective view of a similar system to that shown in FIG. 1 taken at a different angle;

FIG. 9 is a front view of the wafer top plate and optics;

FIG. 10 is a left front perspective view of a portion of the inspection station including the wafer top plate and optics;

FIG. 11 is a right front perspective view of the top portion of the inspection station;

FIG. 12 is a side perspective view of the top portion of the inspection station as shown in FIG. 11;

FIG. 13 is an enlarged view of the optics and wafer top plate;

FIG. 14 is a side view of the wafer top plate and optics of FIG. 9;

FIG. 15 is a left side perspective view of the top portion of the inspection station as shown in FIGS. 10-12;

FIG. 16 is an enlarged view of one embodiment of the wafer top plate and the x, y and θ aligner;

FIG. 17 is a partial perspective view of the top portions of the inspection and wafer handling stations;

FIG. 18 is an enlarged view of the wafer handling and wafer top plate portions of the invention;

FIG. 19 is a side view of the wafer handling station;

FIG. 20 is a partial view of the darkfield option of the present invention; and

FIG. 21 is an enlarged view of the darkfield lasers of the darkfield option. Similar numerals refer to similar parts throughout the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The automated defect inspection system of the present invention is indicated generally at 10 as is best shown overall in FIGS. 1 and 8 (but in detailed portions in FIGS. 2-7 and 9-21) and is used in one environment to find defects on die on patterned wafers W but is intended for this and other uses including for inspecting whole wafers, sawn wafers, broken wafers, wafers of any kind on film frames, die in gel paks, die in wafer paks, MCMs, JEDEC trays, Auer boats, and other wafer and die package configurations (although hereinafter all of these uses shall be referred to generally as inspection of wafers W). The system inspects for many types of defects including, but not limited to, the following: metalization defects (such as scratches, voids, corrosion, bridging, etc.), diffusion defects, passivation layer defects, scribing defects, glassivation defects, chips and cracks from sawing, probe or bond area defects (such as missing probe marks, discoloration, missing metal and probe bridging), diffusion faults, vapox, etc. The system may also be additionally or alternatively used to inspect interconnects or bumps, such as gold or solder bumps, for defects or other characteristics such as size and shape.

The system and process encompasses, in general, a multiple step process as shown in FIG. 2 of training (step A) the system, creating (step B) an inspection recipe, inspecting (step C) die or wafers based upon this training and recipe, defect review (step D) if desired, and defect reporting (step E) if desired. The system 10 for performing this process includes, in general, a wafer test plate 12, means for providing a wafer to the test plate referred to as 14, a wafer alignment device 16 (x-y- θ or x-y-z- θ aligner) for aligning each and every wafer at the same x, y, and θ location or x, y, z, and θ location, a focusing mechanism 18, a camera 20 or other visual inspection device for visually inputting of good die during training and or visual inspection of other unknown quality die during inspection, a parameter input

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device 22 for inputting parameters and other constraints or information such as sensitivity parameters, geometries, die size, die shape, die pitch, number of rows, number of columns, etc., a display 24 for displaying the view being seen by the camera presently or at any previous saved period, a computer system 26 or other computer-like device having processing and memory capabilities for saving the inputted good die, developing a model therefrom, and comparing or analyzing other die in comparison to the model, a marking head, a frame 30, a hood 32, a control panel 34, and a system parameters display 36.

In more detail the system 10 and associated process are as follows. Training (step A) as initially displayed in FIG. 2 and shown in more detail in FIG. 3 involves (1) defining and/or training alignment features and parameters (and storing) in the computer system 26 for use during training where all of this is shown as step A1, (2) defining (and inputting into the computer system) the wafer and/or die geometries, the wafer and/or die sizes, the die pitch, the number of rows, the number of columns, etc. and storing all such information in the computer system 26 for use during training and/or inspecting where all of this is shown as step A2, (3) training the system as to what a "good die" comprises by aligning via device 16 and viewing via camera 20 a plurality of known good die and forming a model within computer system 26 to define what an ideal die should look like based upon the common characteristics viewed where all of this is shown as step A3, (4) setting inspection parameters which are values that indicate to the computer system 26 how close an unknown quality die must match the good die model to be considered a good die (that is, what differences from the exact model are tolerable to still be considered a good die) where all of this is shown as step A4, and (5) saving this training model and its features, parameters, etc. to the computer system 26 as shown by step A5.

Creating (step B) an inspection recipe involves creating a new recipe (if a previously defined recipe is to be used, then the creating step of B is skipped). Creating a new recipe involves (1) defining how wafers W are selected from cassettes or other storage receptacles where all of this is shown as step B1, (2) defining how the dies on each wafer W are to be selected for defect inspection: where all of this is shown as step B2 (often dies are merely inspected in sequential or similar order; however, any other order may be defined), (3) defining how defect inspection map files are imported and exported where this is shown as step B3, and (4) save this recipe where this is step B4.

Inspecting (step C), referred to as defect inspection, involves (1) inputting a wafer identification code, if desired, and is referred to as step C1, (2) selecting a recipe that was defined in step B where this selecting is step C2, (3) selecting and inputting a product setup which is step C3, (4) loading a wafer onto the wafer test plate 12 using the wafer providing means 14 where loading is step C4, (5) aligning the wafer on the wafer test plate 12 using the wafer alignment device 16 for aligning each and every wafer at the same x, y, and θ location or x, y, z, and θ location and using the defined and/or trained alignment features and parameters of step A1, all of which is shown as step C5, (6) focusing the camera 20 onto the wafer W if needed, all of which is shown as step C6 (7) collecting an image of the wafer W using the camera 20 by moving the plate 12 to align the camera with a first die or other portion thereof, viewing and recording that die or portion thereof by opening the shutter and allowing the camera to view and record the image, moving the plate 12 to align the camera with another die or portion thereof, viewing and recording this another die or portion thereof, and repeating these steps until all of the die or portions thereof on the wafer that are desired to be viewed have been viewed and recorded, all of which is shown as

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step C7, (8) simultaneously during step C7, determining where defects are located on the given die being viewed based upon the "die" model of step A3 and the tolerances of step A4, all of which is step C8, and (9) creating a defect map of the wafer W which is a collection of all of the images of all of the die including all of the defects found thereon, all of which is step C9.

Alternatively, step C7 may be replaced by the step of collecting an image of the wafer W using the camera 20 by continuously moving the plate 12 so as to scan over all of the die on the wafer whereby the wafer is illuminated by a strobe light at a sequence correlating to the speed of the moving plate so that each die is strobed at the precise time it is under the camera 20. This allows for the continuous collecting of images without necessitating the stop and go procedure of aligning the camera with a first die, viewing and recording that die, moving the plate 12 to align the camera with another die, viewing and recording this another die, and repeating these steps until all of the die on the wafer have been viewed and recorded, etc.

Defect review D if and when it is desired (which is generally at the conclusion of defect inspection on a given wafer W since it is at this point that defect classification is often desired) involves (1) loading the defect map created in step C9, this reloading referred to as step D1, (2) selecting a defect to review (or alternatively reviewing all of the defects on the wafer in order) as step D2, (3) moving the plate 12 so as to position the wafer W such that the particular die with defect thereon is properly positioned under the camera 26, all of which is step D3, (4) user viewing and classifying of the defect such that user of the system 10 views and classifies the viewed defect, all of which is referred to as step D4, (5) repeating of steps D2-D4 until all of the defects that the user desires to review have been reviewed and classified as step D5, and (6) saving of classified defect map as step D6 as well as alternatively or additionally saving the defect information in any of a number of other formats for database or other management and review.

Defect reporting E if and when it is desired involves exporting or printing out the data stored in database format in step D6. This data may then be analyzed or otherwise used to perform statistical or other analysis on the types of defects, frequency of defects, location of defects, etc. which is useful to the wafer W manufacturers so as to allow them to focus on defect laden areas.

The above described steps and substeps are a basic explanation of the system and process of the present invention. The following description is a more detailed explanation of various parts and systems, and details of the steps these perform.

The wafer test plate 12 is a rotary stage that is equipped with a universal interface platform with vacuum, all of which provides a flexible interface for wafer and die package fixturing. It is defined such that it quickly mounts and inspects whole wafers, sawn wafers on film frame, die in gel pak, die in waffle-pak, MCM, JEDEC trays, Auer boats, and other wafer and die package arrangements and configurations.

The means for providing a wafer to the test plate referred to as 14 may be either manual in that the user moves the wafer from a cassette or magazine to the test plate 12, or automatic as is shown in the embodiment of the Figures. In the automatic environment, the wafer providing means 14 includes a robotic arm that pivots from a first position where a wafer W is initially grasped from a magazine or cassette to a second position where the wafer W is positioned on the wafer test plate 12 for inspection. After inspection, the robotic arm pivots the wafer W from the second position at the test plate 12 back to the first position where the wafer W is placed back in or on the magazine or cassette.

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The robotic arm in the embodiment shown is a two part arm which has two sections, the first of which pivots about a center support and the second of which pivots about the end of the first. Surrounding the robotic arm in one embodiment is at least one cassette receiver (two shown in FIG. 1) which receives standard wafer transportation cassettes in which multiple wafers are stacked, an optional wafer pre-aligner which would provide a pre-alignment or rough alignment of the wafer, an OCR (optical character recognition) system, and the inspection station which includes the wafer top plate 12, x-y- θ aligner 16, optics 18, cameras 20, etc.

The wafer alignment device 16 for aligning each and every wafer at the same x, y, z, and θ location is a precision system of rotary motors, ball screws, direct or

belt driven motors, worm or other gears, actuators, hydraulics, push rods, vacuums, or other mechanical or electrical equipment for moving the rotary stage either linearly or angularly to a precise desired location.

The same alignment mechanism and process is used during training as is used during inspection. Specifically in the embodiment shown, the wafer alignment device is a 2-D x, y and θ alignment process that is optionally coupled to a z height control. Specifically, it is in one example a 2-D x and y course alignment followed by a fine theta (θ) alignment process, all of which is coupled with and followed by a focus map process (using a previously generated height or focus map) for determining height or z and thus assuring the wafer is in focus. Basically, the course alignment uses a pattern located at the approximate wafer center which it has been trained to know and expect x and y location on thereby allowing it to find this pattern and x and y (2-D linear) orient the wafer as such to at least course align it. This, orientation is performed using the stage 12. Thereafter, fine alignment is performed by using a pattern near the perimeter of the wafer which it has been trained to know to get the θ (rotational) alignment correct. This is also performed using the stage 12. In both cases, the camera finds the pattern and the alignment mechanism moves the wafer until it is aligned.

The focus map or z orientation is performed by adjusting the camera and/or camera arm distance prior to focusing as is described below, and/or by changing, objectives, and/or by focusing the camera. The adjustment that is performed is based upon a height map of the wafer from which focus is defined using pre-programmed points on the wafer.

The focusing mechanism 18 is an optical imaging mechanism with multiple optics therein for using different inspection resolutions. A motorized microscopic turret allows for selecting of the imaging optics from the multiple choices. For instance, a number of optics, such as three or five optics, may be supplied and typical choices include 1.25x, 2.5x, 5x, 10x, 20x, 50x and 100x objectives although any other objective is contemplated. The motorized microscopic turret and discrete objectives provide the means to select the optical magnification.

The camera system 20 or other visual inspection device is for visual inputting of good die during training and for visual inspection of other unknown quality die during inspection. The camera system may be any type of camera capable of high resolution inspection. An example of one part of such a camera system is a 3-CCD inspection camera used to capture die or other images during defect analysis.

One example of camera system 20 that is contemplated by the present invention is a two (2) camera system where one camera is an inspection camera and the other is a viewing camera. The inspection camera is a high resolution CCD camera that provides high resolution gray-scale images for inspection. The viewing camera is a high fidelity color image camera for visual review of found defects in, for

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example, 758x582 pixel resolution or alternatively 1008x1018 pixel resolution or other known pixel sizes. In addition, the viewing camera provides high quality color images for operator defect review.

Computer controlled optics are provided that use long working distance microscopic objectives so as to provide for low distortion images that are required for accurate defect detection. Multiple magnifications may be automatically selected based on the user defined inspection recipes as described below.

Computer controlled illumination is integrated into and with the inspection camera and optics to complete the wafer imaging process. Alternatively, the illumination system may be coupled to the camera and optics so long as the illumination system works in conjunction with the camera. In a strobing environment as described herein, the illumination flashes or strobes on and off while the camera is continuously open whereby the strobing of light creates a plurality of differing images as the continuously operating camera passes over the substrate. In a non-strobing environment, the illumination is typically continuous or as needed while the camera shutters, that is opens and closes its viewing aperture such as via in one example a high speed electronic shuttering mechanism, as is needed to capture each desired image on the substrate.

Illumination may be by any known illumination means such as high intensity lights, lasers, fluorescent lights, arc discharge lamps, incandescent lamps, etc. The angle of the illumination may be of a brightfield only, darkfield only, or both brightfield and darkfield variety.

Brightfield illumination involves illuminating the substrates from above where the illumination system is typically adjacent to or part of the camera which is mounted directly above the substrate, that is at approximately a 90° or so orientation to the substrate as shown in FIG. 1. In the embodiment shown, the brightfield illuminator is adjacent to the camera and functioning in unison therewith. This brightfield illumination is very effective in illuminating flat or relatively flat objects on a substrate as the light is reflected generally back to the camera. In contrast, 3-d objects on the substrate will angularly reflect the light causing the light to be angled away from the camera. As a result, flat objects appear bright to the camera while 3-d objects appear dark.

Darkfield illumination is often used in conjunction with the brightfield to "brighten" the 3-d objects, or in the alternative to only brightly see the 3-d objects.

The darkfield light is provided at low angles to the wafer top plate 12. The darkfield illumination works inverse of the brightfield in that it reflects light up to the camera at an angle, such as any angle between approximately 10° and 90°, to the substrate when the darkfield light is introduced to 3-d object on the substrate at an angle rather than from directly above as in brightfield illumination, while reflecting light at an angle along the periphery opposite the light introduction where the object is flat. Darkfield light thus brightly illuminates 3-d objects while not illuminating flat objects very well.

In one embodiment of the present invention, two darkfield options are available, namely a high angle darkfield illumination and a low angle darkfield illumination. The high angle darkfield illumination is provided in one embodiment at an angle between approximate 10° to approximate 80° between the brightfield illumination provided from directly above the substrate (perpendicular to the substrate) to the low angle darkfield illumination provided at almost a parallel angle to the substrate. High angle darkfield illumination may be provided by any of a number of light sources including all of those listed above describing general illumination; however, in one embodiment the high angle

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darkfield illumination is either a ring light, or a fiber optic bundle providing light angled toward the substrate at approximately a 45° angle.

The system 10 with a low angle darkfield option as shown best in FIGS. 20-21 to include a plurality of illuminators spaced about the periphery. In one example four illuminators are used and each is equally spaced from the other at a 90° separation. In another example (FIGS. 20-21 where one pair are shown), eight illuminators are used at a 50° separation, and in an alternative associated therewith and shown in the drawings, the illuminators are teamed up in pairs at 90° separation to double the capacity of the illuminators at a given angle. In the embodiment shown, the low angle darkfield illuminators are lasers. In this embodiment, the lasers provide darkfield light at low angles to the wafer top plate 12. Specifically, the angle between the laser beam focused on a focal point of the substrate and the general planar nature of the substrate is low or minimal, such as less than 10°. As a result, the darkfield illumination emitted from the laser reflects off of the substrate and up to the camera at an approximate 80° to approximate 90° angle to the substrate, and preferably approaching approximately 90°, when the darkfield light is introduced to the 3-d object, such as a bump, on the substrate.

The user, where the system is equipped with both brightfield and darkfield illumination, has the option of using one or the other or both. This provides significant options. For instance, if the inspection is being performed on die that tend to only have flat objects thereon, brightfield illuminates these objects well and is more than sufficient for this type of inspection. Alternatively, if the inspection is being performed on die that tend to have 3-d objects, then darkfield may be sufficient. However, as in many cases, such as with gold bumps which are generally very flat but very rough and tend to include 3-d nodules protruding therefrom, a combination of the two is often beneficial. In this example, the brightfield illumination indicates the presence of any defects such as scratches, etc. and the presence of the bump while the darkfield illumination shows the nodules and rough surface on the bump. Without the darkfield, the bump shows up as a dark image. Once darkfield is introduced, the nodules are located as white spots on the bump.

Darkfield also assists in defect classification because brightfield light does not differentiate between a particle or defect that extends from the surface versus one that is embedded or scratched into the surface. Darkfield illumination does differentiate these extending versus embedded defects.

In one embodiment, the system 10 includes a brightfield illumination system that is physically located adjacent to or incorporated physically into the camera so as to provide brightfield illumination from above the objects illuminated. In another embodiment, the system 10 includes a darkfield illumination system that is located peripherally around the wafer top plate 12 at low angles of difference from the top plate, angles such as 1° to 10°. In an even further embodiment, both brightfield illumination from above the object and darkfield illumination from around the periphery of the object are provided. As indicated above, the illumination as provided by the brightfield and darkfield illumination systems may be provided by any known illumination source such as a white light source such as incandescent, fluorescent, or other similar gas envelope or similar electrical lights, or by lasers or similar devices.

The parameter input device 22 is for inputting parameters and other constraints or information. These parameters, constraints and information include sensitivity parameters, geometry, die size, die shape, die pitch, number of rows, number of columns, etc. It is contemplated that any form of input device will suffice including a keyboard, mouse, scanner, infrared or radio frequency transmitter and receiver, etc.

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The display 24 is for displaying the view being seen by the camera presently or at any previous saved period. The display is preferably a color monitor or other device for displaying a color display format of the image being viewed by the camera 20 for the user's viewing, or alternatively viewing an image saved in memory. This monitor, or another adjacent or other monitor may be used to view the gray-scale inspection image of the camera 20 that is being used by the system 10. This display 24 is used during inspection to show the image being viewed by the camera 20. In addition, the system parameters display 36 is also available for displaying other information as desired by the user such as system parameters.

The computer system 26 or other computer having processing and memory capabilities is for saving the inputted good die, developing a model therefrom, and comparing or analyzing other die in comparison to the model based upon defect filtering and sensitivity parameters to determine if defects exist. The computer system 26 is also used to perform all other mathematical and statistical functions as well as all operations. In one embodiment, the computer system 26 is of a parallel processing DSP environment.

The marking head is provided for marking a particular die such as a defective one. In one embodiment, the marking head is a die inking mechanism. It is used whereby each die may be inked after inspection, or all defective die may be inked, or all defective die may be inked after review and/or classification, etc. Inking may also be used in a "forced inking" manner whereby pre-specified die are inked regardless of electrical or visual inspection such as all die at the edge of the wafer.

An air knife is optionally provided for cleaning the wafers prior to inspection.

The air knife is basically a conduit of some design through which air may be injected where the conduit includes one or more orifices or outlets. The air is projected out of the orifices which are selectively positioned on the conduit and in relation to the wafer so as to blow dust and other particles off of the wafer prior to review. This helps to eliminate false defect determinations.

These systems and parts are part of system 10 and are used to perform the defect inspection. This defect inspection is briefly described above, and is now described below in detail.

The overall training step A is described below in more detail.

The step A1 is defining and/or training alignment features and parameters (and storing) in the computer system 26 for use during training. This alignment technique, when performed in step A3 and C5 as described below to define a good die and to inspect, is a two function process, namely a physical alignment and an image alignment. At this point we define what parameters are to be used during the physical and image alignment. These parameters include defining markers as are needed during physical alignment, and distinct elements and buffers as are needed during image alignment. The actual physical and image alignment steps occur during step A3 and C5 as described below.

The step A2 is defining (and inputting into the computer system) the wafer and/or die geometry, the wafer and/or die sizes, the die pitch, the number of rows, the number of columns, etc. and storing all such information in the computer system 26 for use during training and/or inspecting.

The step A3 is training the system as to what a "good die" comprises by aligning via device 16 and viewing via camera 20 a plurality of known good die and forming a model within computer system 26 to define what an ideal die should look like based upon the common characteristics, elements, ranges, etc. viewed. A good die is defined as a die that does

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not have defects but may vary. Well and is actually likely to have process variations in it; however all of these process variations have been deemed not to be defects and rather to be acceptable variations. Preferably, the entire or full spectrum of acceptable random deviations is supplied by this training set of typically twenty, thirty or up to one hundred good die that are shown to the system during training, although no minimum (however, definitionally at least two are required to meet the definitional requirements of a mean and standard deviation) or maximum is required. However, the larger the pool the more accurate the results because a better, more diverse model is created. Thus color drifts and contrast shifts as well as many other deviations would be part of the training set. Basically, the system 10 performs die inspection by studying a user provided set of known good die.

The alignment may involve either physical alignment or image alignment, or both. Physical alignment basically involves inputting specific location markers on or around each wafer, die or sub-section of die which are used as location points from which the wafer and die are located and aligned. At step A1, these markers were defined.

Physical alignment involves the wafer test plate 12 via the wafer alignment device 16 aligning each and every wafer, die, etc. in the same x, y, and θ location by looking for and aligning with these location markers. In use, the system takes an overall picture or image of the wafer, die or sub-section thereof and looks for the specific location markers. The system uses a hunting method to find the markers. Once one or more specific location markers are identified, and it is found that the markers are in some other location or orientation than expected, then the wafer test plate 12 spins, turns, adjusts or otherwise moves in a translational or rotational manner in the x, y, and θ directions the wafer, die or sub-section.

The system also may perform image alignment. During step A1, distinct elements and buffers, as are needed in image alignment, were defined.

This image alignment may also be referred to as software alignment as the software actually performs the alignment by aligning the image that is taken rather than physically moving the wafer or die. This image alignment is performed on each section of the wafer, such as each die, during one or both the good die modeling and the unknown quality die inspecting. It is often necessary because each image taken may be off slightly in comparison to adjacent images or to a common location on another wafer. The actual process of image alignment basically assures that all images taken of a particular location will align, that is when overlapped the features of the images will align, rather than have an offset or twist, so that only defects stick out.

Image alignment, when performed as needed in steps A3 and/or C5, involves the camera looking for a distinct element on the die from which to turn or move the image to "square" it up. The distinct element is generally an element large enough that defects therein will not be an issue. The element also must be of a distinct shape. If the distinct element is where we expect it to be then the image lines up and no image alignment is necessary; however, it is not, then the distinct element must be found and the image adjusted.

The hunting for the distinct element in image alignment may be performed on the entire die. However, this is expensive and time consuming. As a result, smart alignment may alternatively be performed.

With smart alignment, a buffer is defined into the image. This buffer allows for "wiggle", that is movement or twisting in the image. This buffer is typically an x amount and a y amount of movement that is expected. This buffer is then used to define the area around the expected location of the

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distinct element to be searched for the distinct element. Once the distinct element is found, then the x and y distance that the distinct element is off from the expected distinct element location is the distance the entire image is moved in the x and y direction to align the image.

The viewing encompasses collecting an image of the wafer W, a known good, wafer, using the camera 20 by moving the plate 12 to align the camera with a first image which may be the whole wafer, a part of the wafer, a die, or a part of a die and then viewing and recording that image. Thereafter moving the plate 12 to align the camera with another image, viewing and recording this another image, and repeating these steps until all of the images on the wafer have been viewed and recorded. An alternative step C8 involves continuous motion and strobe illumination as is described below. In either case, this is then repeated for a plurality of known good die or wafers as viewing of a pool of wafers is necessary to form a model of a good die.

The actual defect inspection algorithm is calculated from the collection of images of the set of "good die". An image or images are taken of each good die in a set of good die. Each image is composed of pixels such as for example an approximately one thousand by one thousand (1000x1000) array or grid of pixels, although any number may be used. For each same pixel on all of the good die images, that is for each common x,y coordinate, which is a pixel, a mean and standard deviation is calculated of the pixel value, that is the gray-scale value of that given pixel. So in a grouping of 30 good die, as used as an example above, where each die is an array of 1000x1000 spots (1million total spots) each referred to as a pixel, a mean and a standard deviation of the gray-scale number for each pixel at x,y coordinate 1x1, 1x2, 1x3 and so on all the way to 1000x1000 is calculated; that is a mean and standard deviation is calculated for pixel 1x1 using the gray scale measurement for pixel 1x1 on all 30 die, and so on for each of the 1 million die.

In one embodiment, the gray scale numbers for each pixel, are used to calculate the mean and standard deviation, and these are in a range. One example is a 256 scale scheme, where one end, such as 0 in the 256 scale scheme, represents a dark or black colored or shaded image and the other end, such as 255 in the same 256 scale scheme, represents a white colored or shaded image.

The collection of all of the means, that is for all of the pixels, for a type of die is in effect the perfect die of that type and in essence defines the good die model. The collection of all of the standard deviations, as adjusted as described below for sensitivity and filtering, for a type of die is in effect the allowable range inside of which the die is deemed good, and outside of which the die is questioned as to defects.

The step A4 is setting inspection parameters which are values that indicate to the computer system 26 how close an unknown quality die must match the good die model to be considered a good die (that is, what differences from the exact model are tolerable to still be considered a good die). Several such inspection parameters are defect sensitivity, minimum defect contrast and defect filtering.

In the embodiment shown defect resolution is dependent upon the optical magnification. Selecting a higher magnification results in a smaller field of view of the image. The magnification selected may result that multiple images are required to inspect a single die or that many can fit in a single image. The die size and optical magnification are inputted in step A2. It is however noted that smaller defect resolution results in more imaging per die and thus additional time to defect inspect the same quantity of die. Alternatively, a camera with adjustable resolution may be implemented whereby this adjustment feature would control sensitivity rather than image size.

Defect sensitivity involves user defined multiplication factors of the mean and standard deviations calculated to

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define the known good die model as described above. Defect sensitivity is described below in more detail in step C7.

Minimum defect contrasting involves user defined absolute limits on the upper and lower limits defined from the mean and standard deviation. Minimum defect sensitivity is also described below in more detail in step C7.

Defect filtering involves statistical or data filtering including area, size, region of interest and/or clustering filtering, as well as connection and/or reduction factor filtering. This filtering allows the user to filter out items that appear as defects but are not in critical areas, of sufficient size or shape or are otherwise acceptable and thus desirable to not be labeled as defects. In the embodiment shown, defect filtering is provided for each inspection recipe or round. This allows the system performance to be optimized for the user's application. The defect filtering feature uses defect position and geometry information such as shape, size, x-y coordinates, etc. to automatically determine if the defect requires further review and classification by the operator. An example is as follows, any defects above a certain size may be determined to be positively defects not subject to further review. In addition or as an alternative, any defects below a certain size are filtered out as not being a defect although being outside of the "good die" model. There may also be an area in between that requires operator review at the review steps of step D4. Similarly, shapes, positions, configurations, arrangements, etc. of anomalies from the "good die" model may be filtered. Defect filtering is further defined below.

The step A5 is saving this training model and its features, parameters, etc. to the computer system 26.

The overall inspection recipe creating step B involves creating and storing an inspection recipe for each type of item, that is wafer, die, etc. to be inspected. An unlimited number of inspection recipes can be created, copied and edited so as to allow the user to customize the inspection process.

The step B1 is defining how wafers W are selected from cassettes or other storage receptacles. The step B2 is defining how the dies on each wafer W are to be selected for defect inspection. The step B3 is defining how defect inspection map files are imported and exported. The step B4 is saving this recipe.

The overall inspecting step C, referred to as defect inspection, is an advanced proprietary digital image analysis technique for semiconductor wafer inspection. The system performs wafer inspection after first studying a user provided set of known good die as described above in step A3. This method of learning and inspecting is more powerful than traditional template or model matching inspection. It is noteworthy that even random variations in a known good die may be determined to be acceptable which is not the case with traditional template or model matching. In effect, this robust approach to wafer inspection functions similar to a human operator without the fatigue and other problems.

The step C1 is inputting a wafer identification code if desired. This is required where wafer mapping is to occur because this provides a way to identify each wafer for later review of defects, etc. The wafer identification code may be of any known identification system such as alphanumeric characters, bar codes, 2-D matrix codes, etc.

The step C2 is selecting a recipe that was defined in step B. The step C3 is selecting a product setup if one is desired.

The step C4 is loading a wafer onto the wafer test plate 12 using the wafer providing means 14. Loading onto the wafer test plate may be either by manual loading or using an automatic system where wafer with die thereon are automatically transferred from a cassette or magazine into the inspection area. The automatic system allows for elimination of all manual handling.

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The step C5 is aligning the wafer on the wafer test plate 12 using the wafer alignment device 16 for aligning each and every wafer at the same x, y, z, and θ location and using the defined and/or trained alignment features and parameters of step A1. This has been described above in detail as the same process of physical alignment and image alignment is used here as was used to align the known good wafers to form the good die model.

It is often also necessary to focus the camera 20 onto the wafer W if it is not already focused. This occurs, if needed, during or after step C5 and is the z orienting of the wafer which is defined by a height map. The step C6 is collecting an image of the wafer W using the camera 20 by moving the plate 12 to align the camera with a first image which may be the whole wafer, a part of the wafer, a die, or a part of a die and then viewing and recording that image, and thereafter moving the plate 12 to align the camera with another image, viewing and recording this another image, and repeating these steps until all of the images on the wafer have been viewed and recorded. An alternative step C6 involves continuous motion and strobe illumination as is described below.

The step C7 is simultaneous with step C6 and involves determining where defects are located on the given die being viewed based upon the "good die" model of step A3 and the tolerances or parameters of step A4. Basically, each pixel on the unknown quality wafer is viewed whereby defect sensitivity and filtering are used in conjunction with the "good die" model to determine if the pixel and/or any group of pixels are deemed "good" or questionable.

Initially anomalies or differences between the "good die" model and the image are spotted and then sensitized and filtered. To simplify the determination, an upper level and lower level value is determined for each pixel on each die, based upon the mean and standard deviation calculations as well as the user defined sensitivity and absolute limits. The viewed image is then filtered using one or more of a variety of filter techniques including connection factoring, reduction or noise reducing factoring, and statistical or data filtering on blob identification such as area, size, region of interest, and/or interactive filtering. After filtering, the questionable defect areas are identified. Basically, defect sensitivity and minimum defect contrast are used to define the upper and lower level values which are in effect the adjusted standard deviations on either side of the mean once the sensitivity is factored in. Thereafter, filtering is often used to better identify true defects.

In one embodiment, defect sensitivity is basically a user defined multiple of the standard deviation. Through actual analysis of good and bad die, the user defines a multiple of the standard deviation that most accurately defines all of the defects yet does not wrongly define good die as defects. An example is as follows. Assume three known good die with gray scale values of 98, 100 and 102. The mean is 100 and the standard deviation is ± 2 . The user through inspection knowledge defines the defect sensitivity at 5. The upper and lower limits are then 110 and 90 respectively.

In one embodiment, the minimum defect contrast is similarly a user defined absolute limit. In the above example, the user through knowledge is aware that gray scale measurements with a minimum contrast of 15 are not defective. The minimum defect contrast is thus set at 15 and as a result the upper and lower limit must be 115 and 85 instead.

In the preferred embodiment, a test image is created using simple image subtraction after each pixel of an unknown quality wafer or die is viewed. A test image is created by basically subtracting the gray scale measurement of the test pixel, for example 98, from the good die upper limit, for example 110, for that pixel, or subtracting the good die lower limit, for example 90, from the gray scale measure-

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ment of the test pixel, again 98, to get a binary good or bad indication. The upper and lower limits have preferably been sensitized. If the number is positive then it is colored black as being inside the range (or alternatively white), and if the number is negative then it is colored white as being outside of the range (or alternatively black). A binary black and white image results. This image allows for filtering at a much more rapid speed due to its simplicity in comparison to saving an actual 256 color image. Alternatively, a full color, such as 256 color, image may be used if sufficient memory is available and optimal speed is not vital.

In one embodiment, one or more of the following filters are used on the binary black and white image. Image processing functions such as connection factoring and reduction factoring may then individually or all together be used. Statistical or data filtering on blob identification may also be performed individually or all together.

Connection factoring involves a "close" operation. The identified pixels, in the above example the white one, are dilated and then eroded, or double dilated and then eroded, or any other known combination. This connects or fills in the defects so as to filter out small defects or acceptable irregularities.

Reduction factoring involves an "open" operation. The identified pixels are eroded and then dilated, or double eroded and then double dilated, or any other known combination. This reduces noise.

Blob analysis involves identifying blobs on the binary black and white image. Once identified, various parameters of each are identified including, for example, size such as x size and y size, location, area, etc. Statistical or data filtering is then performed on the parameters of the blobs.

Such statistical or data filtering includes area filtering, size filtering, region of interest filtering, and interactive defect classification filtering. Area filtering discards blobs of a pre-set area or smaller. Size filtering discards blobs of a pre-set x or y size or smaller. Region of interest filtering allows the user to define locations on the die that are not of as much or any importance and as such any defects thereon would be irrelevant. Finally, interactive defect classification involves clustering of close but not touching identified pixels where the distance defining close is user defined.

Basically, the unknown quality die are inspected by viewing the image and comparing each pixel with its mean and standard deviation via the upper and lower limit values. Sensitivity and filtering also allows for compensation for factors that are deemed by the user to be more or less critical. In sum, if any one of the given viewed pixels in the unknown quality die is outside of the upper and lower limit values as sensitized and filtered, then the die is defective and as described below, that defective spot is inked or otherwise noted.

The step C8 is creating a defect map of the wafer W which is a collection of all of the defect data of all of the die and is stored in a data file. In the preferred embodiment, it is a binary black and white image.

As an alternative to the above described inspection steps, the alternative step C6 which is the step of collecting an image of the wafer W using the camera 20 by continuously moving the plate 12 so as to scan over all of the die on the wafer whereby the wafer is illuminated by a strobe light at a sequence correlating to the speed of the moving plate so that each die is strobed at the precise time it is under the camera 20. Basically a short illumination pulse of light on the moving plate effectively "freezes" the image. This allows for the continuous collecting of images without necessitating the stop and go procedure of aligning the camera with a first die, viewing and recording that die, moving the plate 12 to align the camera with another die,

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viewing and recording this another die, and repeating these steps until all of the die on the wafer have been viewed and recorded, etc.

The overall defect review step D is generally at the conclusion of defect inspection on a given wafer W since it is at this point that defect classification is often desired. The defect inspection or detection process of steps C is all automatic and rapid whereby once complete the user may manually inspect only the defects found based upon the parameters, filters, sensitivities, etc. rather than all of the die or wafer for defects. Significant time is saved.

The step D1 is loading the defect map created in step C9. The step D2 is selecting a defect to review (or alternatively reviewing all of the defects on the wafer in order). The step D3 is moving the plate 12 so as to position the wafer W such that the particular defect is properly positioned under the camera 26. The step D4 is user viewing and classifying of the defect such that user of the system 10 views and classifies the viewed defect. Any number of classifications are available and the classifications are user defined. The step D5 is repeating of steps D2-D4 until all of the defects have been reviewed and classified. The step D6 is saving of classified defect map as well as alternatively or additionally saving the defect information in any of a number of other formats for database or other management and review.

The overall defect reporting step E is exporting or printing out the data stored in database format. This data may then be analyzed or otherwise used to perform statistical or other analysis on the types of defects, frequency of defects, location of defects, etc. which is useful to the wafer W manufacturers so as to allow them to focus on defect laden areas. This step E provides for complete and effective data analysis as it reports data in multiple formats including graphical, tabular, and actual image displays. The data that is placed in tabular format allows numerical values to be readily correlated with other values such as electrical formats. The graphical data representation quickly shows trends that would otherwise be difficult to see.

The system 10 is based upon standard computer technology such as Pentium® Pro or similar computer platforms which allow for many different communication options of for example both a serial and network format. For instance, the system includes TCP/IP configuration and may alternatively include SEC-II/GEM or other computer industry standard protocols.

The system 10 may also be used to perform an inspection using a drift map. This is useful where the individual die of the wafer W are cut up on a film and stretched as needed for picking up and removal therefrom as is well known in the art. The problem here is that during stretching, the orthogonality may be lost and the die move in different directions and ways as the film material unevenly stretches. The approximately square or rectangular cut dies are now oriented in all different directions and as such a row of die is no longer straight but rather wavy or otherwise disoriented. When this drastic stretching and loss of orthogonality occurs, a drift map and drift step is added to account for this. This step is typically inserted prior to scanning.

In one embodiment, a frame grid is created for the purpose of defining the expected location of each die. It is known to stretch the film sawn wafers are transported on so as to allow easier picking up of each die without damaging neighbor die. This stretching however is typically not uniform resulting in disoriented die. The drift map predicts the stretched location of each die using the starting point of the die which was known due to the rigidity before sawing, and the pitch.

To create a drift map, a mark or dummy die is placed on the wafer at every nth location, such as every 10th. Using

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machine vision, the system 10 looks for the mark at its expected location and then looks therearound if not found. Once the actual location is found, the machine vision proceeds to the expected location of the next mark and reiterates through the process. Once all of the marks have been found, a pitch is calculated assuming consistent behavior in between marks. Using this pitch and knowing the original location of each die prior to sawing, a drift map is created which accurately predicts the location of the die.

The system 10 may also incorporate use of an autofocus feature. Such a feature is based upon a sharpness calculation where a sweep of the image is taken at each of a predefined picture point. Thereafter, a sharpness calculation is used to find the correct focus point. To save time, this may be performed on only every nth image.

In sum, the basic sequence of operation is as follows, with the automated wafer transfer and wafer mapping options removed. The operator or user must first train the system as to what a "good die" is, that is create a good die model, or choose an existing good die model. As indicated above, this involves inputting and using location markers to properly align a plurality of known good die such that each die is imaged from the exact same x, y, z and θ location. In addition, wafer and/or die geometry, sizes, pitch, number of rows, number of columns, etc. must be inputted prior to imaging of good die. The plurality of good die are then each aligned and viewed by the CCD camera such that the computer system then forms a "good die" model by grouping all of the common characteristics, noting the ranges of pitches, colors, angles, locations, etc. Basically, the system 10 performs wafer inspection by studying a user provided set of known good die. It is generally preferred that at least twenty or thirty die are provided, although no minimum or maximum is required. Inspection parameters are also set to indicate how close an unknown quality die must match specific characteristics of the "good die" model to be considered a good die. These include sensitivity parameters and defect filters.

The user must also create or select a previously stored inspection recipe. This includes information as to how wafers W are selected from cassettes or other storage receptacles, how the dies on each wafer W are to be selected for defect inspection, how defect inspection map files are imported and exported, etc.

The system 10 is now ready to inspect unknown quality die. If identification codes are being used as are necessary where wafer mapping is active, one must be inputted at this point. Thereafter, a wafer W (or sawn wafer, or die in gel-pak, or die in wafer pak, etc.) is loaded onto the inspection area and specifically the wafer test plate 12 (which is under the inspection camera). This is accomplished using the wafer providing means 14. Thereafter, the wafer alignment device 16 aligns the wafer at the same x, y, z, and θ location as the "good die" were loaded by using the defined and/or trained alignment features and parameters of step A1. The magnification desired is then selected and thereafter the camera 20 is focused.

The system is now ready to collect an image of the selected area (the first die position) of the wafer W using the camera 20 by moving the plate 12 to align the camera with the selected area, such as a first die position, so as to take a first image thereof which may be the whole wafer, a part of the wafer, a die, or a part of a die and then viewing and recording that image. Automatic defect inspection and bond pad analysis are performed on the die's digital image. If the die is inked, it is automatically identified (mapped) as an "inked die", and typically not inspected. If the die is not inked, and a defect was found, then the system will collect and store detailed information about each defect such as defect location on the die, size, shape, etc.

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The plate 12 is then moved to align the camera with another selected area, which may be the next adjacent area or not, to take an image thereof (the second die position) on the wafer adjacent to the first image. Basically, the plate is indexed under the inspection camera to the next die position. This second die position is then viewed and recorded. These steps are repeated until all of the images on the wafer have been viewed and recorded. Simultaneous with these image viewing steps, defect sensitivity and filtering are used in conjunction with the "good die" model viewing to determine if initial anomalies or differences between the "good die" model and the image are actual defects or if they should be filtered out. A defect map of the wafer W is then created in the computer system from the collection of all of the defect of all of the die including all of the defects found thereon.

In another embodiment, rather than move the plate in incremental steps, the plate is continuously moved during strobe illumination thereof. The sections of the wafer are then scanned by synchronizing the camera with a strobe illumination so that when the camera is properly positioned over each section of the moving substrate, the strobe illumination occurs simultaneous with the image collection via the camera.

At the conclusion of defect inspection on a given wafer W, defect classification is often desired. Each archived defect is manually reviewed by the user where the plate 12 is moved to the position on the wafer W that the particular defect is positioned at so that the user may view and classify the defect. This is then repeated for all defects. The classified defects are then saved as a classified defect map.

That wafer is then removed and another wafer is loaded for inspection. This removal and loading of a new is either manually performed or may be automatically performed.

Accordingly, the invention as described above and understood by one of skill in the art is simplified, provides an effective, safe, inexpensive, and efficient device, system and process which achieves all the enumerated objectives, provides for eliminating difficulties encountered with prior devices, systems and processes, and solves problems and obtains new results in the art.

In the foregoing description, certain terms have been used for brevity, clearness and understanding; but no unnecessary limitations are to be implied therefrom beyond the requirement of the prior art, because such terms are used for descriptive purposes and are intended to be broadly construed.

Moreover, the invention's description and illustration is by way of example, and the invention's scope is not limited to the exact details shown or described.

Having now described the features, discoveries and principles of the invention, the manner in which it is constructed and used, the characteristics of the construction, and the advantageous, new and useful results obtained; the new and useful structures, devices, elements, arrangements, parts and combinations, are set forth in the appended claims.

We claim:

1. An automated system for inspecting a substrate such as a wafer in any form including whole patterned wafers, sawn wafers, broken wafers, and wafers of any kind on film frames, dies, die in gel paks, die in wafer paks, multi-chip modules often called MCMs, JEDEC trays, Auer boats, and other wafer and die package configurations for defects, the system comprising:

- a wafer test plate;
- a wafer provider for providing a wafer to the test plate;
- a visual inspection device for visual inputting of a plurality of known good quality wafers during training and for visual inspection of other unknown quality wafers during inspection;

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at least one of a brightfield illuminator positioned approximately above, a darkfield illuminator positioned approximately above, and a darkfield laser positioned approximately about the periphery of the wafer test plate, all of which are for providing illumination to the unknown quality wafers during inspection and at least one of which strobes to provide short pulses of light during movement of a wafer under inspection based on a velocity of the wafer; and

a microprocessor having processing and memory capabilities for developing a model of good quality wafer and comparing unknown quality wafers to the model.

2. The automated system of claim 1 wherein the visual inspection device visually inputs a plurality of pixels from both the known good quality wafers and the unknown quality wafers in a continuous scan.

3. An automated method of inspecting a semiconductor wafer in any form including whole patterned wafers, sawn wafers, broken wafers, and wafers of any kind of film frames, dies, die in gel paks, die in wafer paks, multi-chip modules often called MCMs, JEDEC trays, Auer boats, and

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other wafer and die package configurations for defects, the method comprising:

training a model as to parameters of a good wafer via optical viewing of multiple known good wafers;

illuminating unknown quality wafers using at least one of a brightfield illuminator positioned approximately above, a darkfield illuminator positioned approximately above, and a darkfield laser positioned approximately about the periphery of a wafer test plate on which the wafer is inspected, all of which are for providing illumination to the unknown quality wafers during inspection and at least one of which flashes on and off during movement of a wafer under inspection at a sequence correlating to a velocity of the wafer; and

inspecting unknown quality wafers using the model.

4. The automated method of claim 3 wherein the inspecting step includes continuous scanning of the wafer.

5. The automated method of claim 3 wherein the optical viewing step includes continuous scanning of the wafer.

* * * * *

UNITED STATES DISTRICT COURT
District of Minnesota

August Technology Corporation, a
Delaware corporation, and Rudolph
Technologies, Inc., a Delaware corporation

JUDGMENT IN A CIVIL CASE

V.

Case Number: 05-1396 MJD/AJB

Camtek Ltd., a foreign corporation

- ☐ **Jury Verdict.** This action came before the Court for a trial by jury. The issues have been tried and the jury has rendered its verdict.
- ☒ **Decision by Court.** This action came to trial or hearing before the Court. The issues have been tried or heard and a decision has been rendered.

IT IS ORDERED AND ADJUDGED THAT:

1. Judgment of infringement, validity, and enforceability of the asserted claims is entered as follows:

- a. *Infringement by Falcon System.* Camtek has been and is directly infringing claims 1 and 3 of U.S. Patent No. 6,826,298 ("Automated Wafer Defect Inspection System and a Process of Performing Such Inspection") in violation of 35 U.S.C. § 271, by making, using, selling and offering to sell all models of the Falcon automated optical inspection machine, including but not limited to models 200, 300, 500, 600, 800, and various PD (post-judice) versions of the foregoing.
- b. *Validity and Enforceability of Asserted Claims.* Claims 1 and 3 of U.S. Patent No. 6,826,298 are not invalid and not unenforceable.
- c. *Prior Art.* The NSX-180 is not prior art under 35 U.S.C. § 102.

2. Plaintiffs are awarded damages in the amount of \$6,782,490. The Court awards to Plaintiffs pre-judgment interest. The Court is empowered to award prejudgment interest pursuant to 35 U.S.C. § 284 and chooses a rate that will ensure complete compensation for the Plaintiffs' loss. See Bio-Rad Labs. v. Nicolet Instruments Corp., 807 F.2d 964, 967 (Fed. Cir. 1986) (citing General Motors Corp. v. Devex Corp., 461 U.S. 648, 655-56 (1983)). There are a number of rates applicable to prejudgment interest, including the treasury bill rate, the prime rate, and the state statutory rate. See Allen Archery, Inc. v. Browning Mfg. Co., 898 F.2d 787, 789 (Fed. Cir. 1990). The Court accepts the Minnesota statutory rate as found at Minn. Stat. § 549.09 and applies it as quantified in the Supplemental Declaration of Frances McCloskey on file with the Court [Doc. No. 546] with a per diem interest of \$1,858.22. Specifically, the Court awards prejudgment interest in the amount of \$1,240,778.34 for a total award of \$8,023,268.34 as of August 28, 2009. Therefore, Defendant Camtek shall pay to Plaintiffs the sum of \$8,023,268.34. In addition, August is entitled to an accounting for all Falcon sales, if any, since September 2008. Post-judgment interest will be addressed separately.

CASE 0:05-cv-01396-JRT-FLN Document 548 Filed 08/28/09 Page 2 of 2

August 28, 2009

Date

RICHARD D. SLETTEN, CLERK

s/Janet Midtbo

(By)

Janet Midtbo, Deputy Clerk



UNITED STATES DISTRICT COURT
District of Minnesota

Richard D. Sletten, Clerk
Wendy S. Osterberg, Chief Deputy Clerk

700 Federal Building
316 North Robert Street
St. Paul, MN 55101
(651) 848-1100

202 U.S. Courthouse
300 South Fourth Street
Minneapolis, MN 55415
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417 Federal Building
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Duluth, MN 55802
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212 U.S. Courthouse
118 South Mill Street
Fergus Falls, MN 56537
(218) 739-5758

CIVIL NOTICE

The appeal filing fee is \$455.00. If you are indigent, you can apply for leave to proceed in forma pauperis, ("IFP").

The purpose of this notice is to summarize the time limits for filing with the District Court Clerk's Office a Notice of Appeal to the Eighth Circuit Court of Appeals from a final decision of the District Court in a civil case.

This is a summary only. For specific information on the time limits for filing a Notice of Appeal, review the applicable federal civil and appellate procedure rules and statutes.

Rule 4(a) of the Federal Rules of Appellate Procedure (Fed. R. App. P.) requires that a Notice of Appeal be filed within:

1. Thirty days (60 days if the United States is a party) after the date of "entry of the judgment or order appealed from;" or
2. Thirty days (60 days if the United States is a party) after the date of entry of an order denying a timely motion for a new trial under Fed. R. Civ. P. 59; or
3. Thirty days (60 days if the United States is a party) after the date of entry of an order granting or denying a timely motion for judgment under Fed. R. Civ. P. 50(b), to amend or make additional findings of fact under Fed. R. Civ. P. 52(b), and/or to alter or amend the judgment under Fed. R. Civ. P. 59; or
4. Fourteen days after the date on which a previously timely Notice of Appeal was filed.

If a Notice of Appeal is not timely filed, a party in a civil case can move the District Court pursuant to Fed. R. App. P. 4(a)(5) to extend the time for filing a Notice of Appeal. This motion must be filed no later than 30 days after the period for filing a Notice of Appeal expires. If the motion is filed after the period for filing a Notice of Appeal expires, the party bringing the motion must give the opposing parties notice of it. The District Court may grant the motion, but only if excusable neglect or good cause is shown for failing to file a timely Notice of Appeal.

willful. The jury also found that claims 1 and 3 were not obvious and that Plaintiffs' NSX-80 device was not "on sale" prior to July 15, 1997. Lastly, the jury awarded \$6,782,490 in lost profits damages.

The Court previously severed for trial Defendant's defense of inequitable conduct, reserving such for a bench trial. In light of the jury's special verdict finding that the NSX-80 was not on sale prior to the critical date of the '6,298 patent, and Camtek's complete reliance on non-disclosure of the NSX-80 as the basis for its inequitable conduct claim, there is no need for a trial on inequitable conduct. See Schreiber Foods, Inc. v. Beatrice Cheese, Inc., 31 Fed. Appx. 727, 732 (Fed. Cir. 2002) (holding that to meet the materiality requirement for inequitable conduct, the reference at issue must necessarily be prior art) (citation omitted). Accordingly, for the reasons stated in an Order dated August 25, 2009, the Court dismissed Camtek's inequitable conduct defense and counterclaim.

Therefore, based on the jury's March 5, 2009 verdict, and the Court's reasons as stated, and all other records and proceedings herein, the Court

HEREBY ORDERS that:

1. Judgment of infringement, validity, and enforceability of the asserted claims is entered as follows:

- a. *Infringement by Falcon System.* Camtek has been and is directly infringing claims 1 and 3 of U.S. Patent No. 6,826,298 ("Automated Wafer Defect Inspection System and a Process of Performing Such Inspection") in violation of 35 U.S.C. § 271, by making, using, selling and offering to sell all models of the Falcon automated optical inspection machine, including but not limited to models 200, 300, 500, 600, 800, and various PD (post-dice) versions of the foregoing.
- b. *Validity and Enforceability of Asserted Claims.* Claims 1 and 3 of U.S. Patent No. 6,826,298 are not invalid and not unenforceable.
- c. *Prior Art.* The NSX-80 is not prior art under 35 U.S.C. § 102.

2. Plaintiffs are awarded damages in the amount of \$6,782,490. The Court awards to Plaintiffs pre-judgment interest. The Court is empowered to award prejudgment interest pursuant to 35 U.S.C. § 284 and chooses a rate that will ensure complete compensation for the Plaintiffs' loss. See Bio-Rad Labs. v. Nicolet Instruments Corp., 807 F.2d 964, 967 (Fed. Cir. 1986) (citing General Motors Corp. v. Devex Corp., 461 U.S. 648, 655-56 (1983)). There are a number of rates applicable to prejudgment interest, including the treasury bill rate, the prime rate, and the state statutory rate. See Allen Archery, Inc. v. Browning Mfg. Co., 898 F.2d 787, 789 (Fed. Cir. 1990). The Court accepts the Minnesota statutory rate as found at Minn. Stat. § 549.09 and applies it as quantified in the Supplemental Declaration of Frances McCloskey on file with the Court [Doc. No. 546] with a per diem interest of \$1,858.22. Specifically, the Court awards

prejudgment interest in the amount of \$1,240,778.34 for a total award of \$8,023,268.34 as of August 28, 2009. Therefore, Defendant Camtek shall pay to Plaintiffs the sum of \$8,023,268.34. In addition, August is entitled to an accounting for all Falcon sales, if any, since September 2008. Post-judgment interest will be addressed separately.

3. The Court grants Plaintiffs' Motion for Permanent Injunction. In light of the jury verdict for Plaintiffs on the question of infringement and against Camtek on its defense of invalidity, the Court evaluates the four injunction factors: irreparable harm; inadequacy of legal remedies (including monetary remedies); the balance of harms; and the public interest. See eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388, 391 (2006). Based on the record before the Court, the Court finds that Plaintiffs have established that they suffer and will continue to suffer irreparable harm, and that the remedies at law, such as monetary damages, would not adequately compensate Plaintiffs for their injury.

a. Irreparable Harm

Plaintiffs, who practice the patent in suit, and Camtek are direct competitors. The evidence at trial established that August and Camtek compete for sales and that Camtek has taken sales and market share from Plaintiffs. This

is more than sufficient to find irreparable harm in view of the infringement determination. See Verizon Servs. Corp. v. Vonage Holdings Corp., 503 F.3d 1295, 1310-11 (Fed. Cir. 2007).

b. Inadequacy of Legal Remedies

There is evidence that Camtek has continued to try and make sales of its Falcon machines in the United States. Courts have recognized that when a patentee loses sales to an infringer, monetary damages are inadequate to compensate for infringement. See Acumed LLC v. Stryker Corp., 551 F.3d 1323, 1328 (Fed. Cir. 2008) ("The essential attribute of a patent grant is that it provides a right to exclude competitors from infringing the patent. In view of that right, infringement may cause a patentee irreparable harm not remediable by a reasonable royalty.") (citation omitted). Further, it may be difficult for U.S. entities to collect judgments against Camtek given its business headquarters in Israel. The Court determines that legal, and specifically monetary, remedies are inadequate in this case in light of the jury's verdict of literal infringement.

c. Balance of Harms

The balance of harms favors Plaintiffs. Courts have recognized that when a patentee loses sales and potential business opportunities to a competitor-

infringer, the balance of hardships favors entry of a permanent injunction. See, e.g. TruePosition Inc. v. Andrew Corp., 568 F. Supp. 2d 500, 532 (D. Del. 2008). This is especially true when the patentee will lose goodwill and potential revenue. See id. As discussed above, Plaintiffs may lose market share and sales if Camtek is allowed to continue U.S. sales of the Falcon. Coupling this with the fact that most of Camtek's sales of its Falcon products are outside the United States, the balance of harms favors Plaintiffs.

d. Public Interest

Public policy favors protection of the rights secured by valid patents. See Abbot Labs. v. Andrx Pharms., Inc., 452 F.3d 1331, 1348 (Fed. Cir. 2006). The Court believes this principle applies well in this case and that it supports Plaintiffs' motion.

In response to Plaintiffs' arguments in favor of a permanent injunction, Camtek has argued that the Court should exercise its discretion and stay any injunction in this case pending appeal after a trial on inequitable conduct and a decision on Camtek's post-trial motions. The force of Camtek's argument on this point is considerably weakened in light of the Court's August 25 Order

dismissing Camtek's inequitable conduct defense and counterclaim and denying Camtek's remaining post-trial motions.

For the foregoing reasons, the Court grants August's Motion for Permanent Injunction.

4. In accordance with the foregoing, CAMTEK is enjoined from making, using, selling, and offering to sell any of its Falcon machines and any machines that are colorable imitations thereof in the United States until the expiration of the '6,298 patent. Falcon machines as used herein are CAMTEK'S inspection machines that CAMTEK has referred to under the name Falcon regardless of the specific model numbers of the machines. An offer for sale is any communication—such as an advertisement, brochure, price quotation, product manual, webpage, verbal offer for sale, or the like—that contains sufficient information regarding the terms of sale for the Falcon machine and any machines that are colorable imitations thereof so as to constitute an offer under the applicable law.

5. CAMTEK is enjoined from practicing the method of Claim 3 or inspection methods that are colorable imitations thereof within the United States until the expiration of the '6,298 patent.

The following specific enjoined activities fall within the conduct described in ¶¶ (4) and (5) above:

- a. communicating with third parties (in person, via phone, via email, or by any other means) located in the United States for the purposes of offering to sell Falcon machines or machines that are colorable imitations thereof, notwithstanding where the third party intends to use the machines;
 - b. advertising or marketing the Falcon machines or machines that are colorable imitations thereof in the United States unless it is made clear on the marketing or advertisements that Camtek's Falcon machines or machines that are colorable imitations thereof are not for sale or use in the United States.
 - c. providing operator training for Falcon machines or machines that are colorable imitations thereof in the United States to the extent that such training is not directly tied to service and repair of such machines that were sold and delivered to customers prior to March 5, 2009; and
 - d. reconstructing the Falcon machines sold and delivered prior to March 5, 2009 located in the United States, which includes substantially improving or otherwise substantially changing such machines relative to the state in which they were originally accepted by the customer including, among other things, providing substantial software or hardware upgrades.
6. CAMTEK is also ordered to identify and secure in the United States (pending appeal), for possible destruction upon exhaustion of any and all appeals, all Falcon machines, or colorable imitations thereof, not yet shipped to customers that are currently located in the United States.

7. Defendant, Camtek Ltd., shall provide written notice of this judgment, and the injunction ordered herein, to: its subsidiaries (including but not necessarily limited to Camtek USA), parents, officers, directors, sales and service agents, servants, employees, attorneys, and any other persons who are in active concert or participation with the above-identified individuals and entities (herein referred to as "CAMTEK"). Defendant shall take whatever means are necessary or appropriate to ensure that this order is properly complied with.

LET JUDGMENT BE ENTERED ACCORDINGLY.

Date: August 28, 2009

s/ Michael J. Davis
Chief Judge Michael J. Davis
United States District Court

UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

AUGUST TECHNOLOGY CORPORATION,
and RUDOLPH TECHNOLOGIES, INC.,

Plaintiffs,

v.

MEMORANDUM OF LAW & ORDER
Civil File No. 05-1396 (MJD/AJB)

CAMTEK LTD,

Defendant.

Christopher D. Newkirk, Arthur, Chapman, Kettering, Smetak & Pikala, P.A.,
counsel for plaintiffs.

Ernest Grumbles, Merchant & Gould, counsel for defendant.

I. INTRODUCTION

On March 5, 2009, a jury returned a special verdict finding that Camtek Ltd.'s Falcon device literally infringed claim 1 of Plaintiffs' U.S. Patent No. 6,826,298 ("the '6,298 patent") and that Camtek literally infringed Claim 3 of the '6,298 patent. The jury found that Plaintiffs August Technology Corporation and Rudolph Technologies, Inc. (collectively "August") failed to prove willful infringement by clear and convincing evidence. The jury also found that Camtek

failed to prove by clear and convincing evidence that claims 1 and 3 were obvious. In addition, the jury found that Camtek failed to prove by clear and convincing evidence that August's NSX-80 device was on sale prior to July 15, 1997. Lastly, the jury awarded August \$6,782,490 in lost profits damages.

On August 25, 2009, this Court considered and ruled on three post-trial motions: two motions for judgment as a matter of law ("JMOL") from Camtek and a motion to dismiss Camtek's inequitable conduct defense and counterclaim from August. The Court denied Camtek's motions and granted August's motion.

This matter comes before the Court on six post-trial motions: three motions for judgment as a matter of law ("JMOL") from Camtek [Docket Nos. 551, 556, & 561], a motion to stay judgment from Camtek [Docket No. 566], a motion to clarify judgment from Camtek [Docket No. 601], and a motion for attorney fees from August [Docket No. 572]. For the following reasons, the Court denies all of these motions.

II. DISCUSSION OF MOTIONS FOR JMOL AND NEW TRIAL

A. Legal Standard for JMOL and New Trial

Federal Rule of Civil Procedure 50(b) states that, when ruling on a renewed JMOL, "the court may: (1) allow judgment on the verdict, if the jury

returned a verdict; (2) order a new trial; or (3) direct the entry of judgment as a matter of law.” In patent cases, a motion for JMOL pursuant to Rule 50(b) is reviewed under the law of the regional circuit. Exergen Corp. v. Wal-Mart Stores, Inc., 575 F.3d 1312, 1317 (Fed. Cir. 2009). Under Eighth Circuit law, to enter JMOL against a jury verdict, the district court must assess “whether there is sufficient evidence to support the jury’s verdict.” White v. Pence, 961 F.2d 776, 779 (8th Cir. 1992). The court must “view the evidence in the light most favorable to the prevailing party and must not engage in a weighing or evaluation of the evidence or consider questions of credibility.” Employers Mut. Cas. Co. v. Collins & Aikman Floorcoverings, Inc., 422 F.3d 776, 779 (8th Cir. 2005) (quotations omitted). “A grant of judgment as a matter of law is proper only if the evidence viewed according to these standards would not permit reasonable jurors to differ as to the conclusions that could be drawn.” Id. (quotations omitted).

The standards for considering a motion for JMOL differ from the considerations behind a motion for new trial. Dominium Mgmt. Servs., Inc. v. Nationwide Hous. Group, 195 F.3d 358, 366 (8th Cir. 1999) (citations omitted). “In passing on a motion for a new trial premised on the weight of the evidence, the district court may rely on its own reading of the evidence and grant a new

trial even where substantial evidence exists to support the verdict.” Id.

“Ultimately, the district court must determine if there will be a miscarriage of justice if the jury’s verdict is allowed to stand.” Id. “The district court’s discretion is not boundless however.” White, 961 F.2d at 780. “[It] is not free to reweigh the evidence and set aside the jury verdict merely because the jury could have drawn different inferences or conclusions or because judges feel that other results are more reasonable.” Id. (quotation omitted). “[T]he ‘trial judge may not usurp the functions of a jury ... [which] weighs the evidence and credibility of witnesses.’” Id. (quoting Mcgee v. S. Pemiscot Sch. Dist., 712 F.2d 339 (8th Cir. 1983)). “Where the subject matter of the litigation is simple; where there exists no complicated evidence or where the legal principles presented are such that they would not confuse the jury, the court should be reluctant to grant a new trial.” Fireman’s Fund Ins. Co. v. Aalco Wrecking Co., 466 F.2d 179, 187 (8th Cir. 1972).

B. Literal Infringement

Camtek seeks a JMOL that no competent evidence provided at trial justified the jury’s verdict of literal infringement on claims 1 and 3 of the ’6,298 patent. Infringement analysis is a two-step process:

First, the court determines the scope and meaning of the patent claims asserted ... [and secondly,] the properly construed claims are compared to the allegedly infringing device. Step one, claim construction, is a question of law ... Step two, comparison of the claims to the accused device, is a question of fact, and requires a determination that every claim limitation or its equivalent be found in the accused device.

N. Am. Container, Inc. v. Plastipak Packaging, Inc., 415 F.3d 1335, 1344 (Fed Cir. 2005).

Camtek provides three bases for its conclusion that the evidence failed to prove literal infringement. First, Camtek argues that no reasonable jury could have found literal infringement of the plurality of wafers and multiple wafers claim limitations. Second, Camtek argues that no reasonable jury could have found literal infringement of the “model wafer” claim limitations. Finally, Camtek argues that no reasonable jury could have found literal infringement of the “based on velocity” and “correlating to velocity” claim limitations. The Court considers each of these arguments separately.

1. Plurality of Wafers and Multiple Wafers Claim Limitations

Camtek argues that no reasonable jury could have found that the Falcon literally infringed the “plurality of wafers” limitation of claim 1 and the “multiple wafers” limitation of claim 3 of the ‘6,298 patent. To support this

position, Camtek states that claims 1 and 3 require that more than one wafer be visually inputted or optically viewed during training, but that the Falcon machines visually input only multiple dies on a single wafer during training.

When defining the term “wafer” in its claim construction order [Doc. No. 268], however, the Court held that a “wafer should be construed to include a part of a wafer.” (Order at 10, Jan. 2, 2008.) In response to Camtek’s argument that the Court would be giving the same meaning to the terms “wafer” and “die,” the Court held that “[a] wafer ... is made up of multiple die, as is a portion of a wafer.” (*Id.* at 11.) “Thus, Plaintiffs’ construction of wafer does not provide the same meaning as die – the former refers to plural, while the latter refers to single.” (*Id.*) In conjunction with this definition, the Court instructed the jury as follows: “Wafer - A thin slice of semiconductor material with circuitry thereon that is ready for electrical testing, or any part thereof. However, a ‘wafer’ is not the same as a ‘die.’ A wafer is made up of multiple die.” Jury Instruction No. 12. As a result, the Court has plainly defined the term “wafer” to also refer to any part of a whole wafer other than a single die. It intended this construction because the patent itself describes an embodiment wherein training is performed by visual inspection of multiple die on a wafer, without indicating that the

training die must come from multiple whole wafers. (Pls.' Trial Ex. 1, FIG. 3; col. 7, ll. 21-27.)

At trial, August presented evidence that the Falcon visually inputs sections of multiple die from different parts of a whole wafer. (Trial Tr. 635:25-638:16.) In fact, the Falcon user manual states, "[t]his process requires you to select, at a minimum, seven dice though we prefer that you select somewhere between 10 and 20 dice." Accordingly, the Court's definition of the term "wafer" could refer to each of the sections of multiple die visually inputted by the Falcon. Therefore, the Court finds sufficient evidence to support the jury's conclusion that the Falcon literally infringed the "plurality of wafers" limitation of claim 1 and the "multiple wafers" limitation of claim 3.

2. Model Wafer Claim Limitations

Camtek argues next that no reasonable jury could have found that the Falcon literally infringed the "model wafer" limitation of claims 1 and 3 of the '6,298 patent. Specifically, Camtek asserts that the Falcon creates a model die, as opposed to a model wafer, and that the model die is compared to other dies during inspection, not other wafers.

At trial, however, August offered sufficient evidence of the Falcon's wafer mapping process to support the jury's finding of literal infringement on the

“model wafer” limitation of claims 1 and 3 of the ‘6,298 patent. (See, e.g., Trial Tr. at 635:25-639:16; Trial Tr. at 1471:19-1472:9; Trial Tr. at 1483:23-1484:1; Trial Tr. at 2339:11-16.) According to the evidence presented, the Falcon creates a wafer map that models where the die should be located on a wafer. (See Trial Tr. at 635:25-638:16; Trial Tr. at 1469:17-24.) August argued that the model die combined with the wafer map essentially created a model wafer with all of the necessary characteristics to inspect an unknown quality wafer. (Trial Tr. at 2743:16-19.) Further, August relied on Camtek’s own expert, Dr. Mellor, who testified that with the model of the dies and the wafer map, the Falcon has the information it needs to inspect a wafer. (See Trial Tr. 2339:17-2340:1.) Finally, August pointed out that Camtek marketed the Falcon as precisely a wafer inspection machine. (See Pl.’s Trial Ex. 65.) Based on the exhibits and testimony presented at trial, the Court finds sufficient evidence to support the jury’s conclusion that the Falcon could have literally infringed the “model wafer” limitation of claims 1 and 3.

3. Based on Velocity and Correlating to Velocity Claim Limitations

Finally, Camtek argues that no reasonable jury could have found that the Falcon literally infringed the “based on velocity” limitation of claim 1 and

“correlated to velocity” limitation of claim 3 of the ‘6,298 patent. Specifically, Camtek asserts that the Falcon uses a position-based method of strobing a light to capture still images of moving wafers, as opposed to a velocity-based system.

In its claim construction order [Doc. No. 268] and Jury Instruction 12, the Court stated that strobing “based on velocity” referred to in claim 1 means “[w]hen the illuminator strobe[] depends, in part, on the rate of change of the position of the wafer such that the illuminator freezes the patterns of the moving wafer onto the visual inspection device.” (Order at 14-19, Jan. 2, 2008; see also Jury Instruction 12.) The Court’s construction does not allow “strobing based solely on position, or some other factor.” (Id.) According to this construction, if evidence establishes that strobing depends on velocity, it does not matter whether strobing also depends on position. (See id.)

In its claim construction order and Jury Instruction 12, the Court stated that strobing “correlated to a velocity” referred to in claim 3 means “[w]hen the illuminator flashes on and off relates to the rate of change of position of the ‘wafer’, such that the illuminator freezes the patterns of the moving ‘wafer’ onto the visual inspection device.” (Id.) Thus, the Court held that “claim 3 requires that the flashing on and off of the illuminator has a relationship to the velocity of the wafer.” (Id.) The Court specifically held that “Plaintiffs did not disclaim

during the prosecution of the '6,298 patent strobing or flashing based on position." (Id.)

At trial, August provided substantial evidence showing that the Falcon utilized velocity-based strobing and that the flashing on and off of the illuminator was correlated to a velocity of the wafer. (See, e.g., Pls.' Trial Ex. 70; Pls.' Trial Ex. 765; Pls.' Trial Ex. 766, Pls.' Trial Ex. 770 Trial Tr. at 586:6-15; Trial Tr. at 609:18-21 Trial Tr. at 649:21-652:16; Trial Tr. at 689: 8-690:5; Trial Tr. at 1501:5-15; Trial Tr. at 1505:8-17; Trial Tr. at 1653:24-1654:9; Trial Tr. at 2344:10-15; Trial Tr. at 2404:24-2405:12; Trial Tr. at 2409:1-24.) Accordingly, based on the Court's claim construction and the exhibits and testimony presented at trial, the Court finds sufficient evidence to support the jury's conclusion that the Falcon could have literally infringed the "based on velocity" limitation of claim 1 and the "correlated to a velocity" limitation of claim 3.

Because the Court finds sufficient evidence supporting each of Camtek's three non-infringement contentions, the Court denies Camtek's Motion for JMOL as to infringement. Furthermore, based on the Court's evaluation of the evidence presented at trial, it determines that there would be no miscarriage of justice if the jury's verdict is allowed to stand. As a result, the Court also denies Camtek's request for a new trial on literal infringement.

C. Lost Profits.

Camtek contends that the jury's award of \$6,782,490 in lost profits is not supported by substantial evidence because there were more than two suppliers in the wafer inspection industry during the relevant period. It claims that August ignored overwhelming evidence of competitors other than Camtek when asserting its "two-supplier market" theory of lost profits and that, had the Falcon machines not been on the market, Camtek's customers would have opted for products from suppliers other than August.

1. Lost Profits

In order to obtain lost profits, a patentee must establish that the lost sales would not have occurred but for the infringement of the defendant. Ericsson, Inc. v. Harris Corp., 352 F.3d 1369, 1377 (Fed Cir. 2003). Such but-for causation can be proven directly, or through the existence of a "two-supplier" market theory or a market share theory. Id. Under a two-supplier market theory of lost profits, the patentee is awarded lost profits on all of the infringer's sales because the customer would not have purchased from anyone else. State Indus. Inc. v. Mor-Flo Indus. Inc., 883 F.2d 1573, 1578 (Fed Cir. 1989). Under the market share theory, a patentee need not demonstrate the absence of non-infringing

alternatives to recover its lost profits. Id. Instead, a patentee is entitled to its lost profits based on its market share. Id.

The jury instructions at trial reflected these various paths to recovery for lost damages. Specifically, the jury was instructed that for lost profits, August could show “but for the infringement August would have made profits” or “that August would have sold its inspection machines to some or all of the customers who purchased the Falcon had the Falcon not been available.” (Jury Instructions 44). The Court instructed the jury that to find lost profits in a two-supplier market, “you must consider whether non-infringing substitutes existed that were acceptable to the specific purchasers of the infringing products, not ‘purchasers’ generally.” (Id. at 45, 47-48.) Finally, the jury instructions also allowed the jury to award lost profits based on a market share theory. (Id. at 51.)

At trial, August presented evidence supporting the lost profits award ultimately given by the jury. (See e.g., Pls.’ Trial Exs. 104, 110, 121, 168, 180, 121, 168, 180, 239, 471, 475, 476, 492, 494, 495, 498, 499, 502, 511, 516, 521, 557-559, 563, 570, 575; Trial Tr. at 361:12-17, 364:13-23, 362:13-21, 448:24-449:22, 529:19-530:13, 815:1-8:16:19, 529:19-530:13, 829:24-889:7, 890:10-912:22, 938:3-11, 941:14-19, 956:1-25, 982:19-983:13, 986:25-987:2, 995:7-10, 997:11-1003:14, 1004:6-1006:2, 1010:24-1037:10, 1189:16-18, 1198:2-1199:22, 1200:18-1201:18, 1630:21-1632:2, 1726:23-

1727:1, 1744:17-23, 1776:11-1777:21, 1784:13-1785:2.) First, August presented evidence showing that, but for Camtek's infringement, there is a reasonable probability that August would have made the infringing sales. Second, August presented evidence indicating that it would have made the sales because the market is a two-supplier market. Finally, August presented evidence showing that, even if it was not a two-supplier market, August held at least 60% of the market share. In this case, the lost profits award equates to less than 100% of Camtek's sales. Based on the exhibits and testimony presented at trial, the Court finds sufficient evidence to support the jury's award of lost profits in the amount of \$6,782,490 to August. The Court therefore denies Camtek's Motion for JMOL regarding lost profits.

2. New Trial or Remittitur Regarding Reasonable Royalty

Camtek also requests a new trial or remittitur regarding a reasonable royalty owed to August as a result of the infringement. "[A] district court should order remittitur only when the verdict is so grossly excessive as to shock the conscience of the court. A verdict is not considered excessive unless there is plain injustice or a monstrous or shocking result." Eich v. Bd. of Regents for Cent. Mo. State Univ., 350 F.3d 752, 763 (8th Cir. 2003) (citations omitted).

Because the Court has already determined that the jury's award of damages is

supported by evidence produced at trial, it declines to remit damages or order a new trial on the issue of a reasonable royalty. As a result, the Court denies Camtek's request for a new trial or remittitur on the issue of damages.

D. Obviousness

Next, Camtek seeks JMOL that claims 1 and 3 of the '6,298 patent are invalid for obviousness under 35 U.S.C. § 103 and, in the alternative, requests a new trial on obviousness. Camtek argues that the Chau prior art patent – which was not considered by the Patent Examiner during prosecution of the '6,298 patent – discloses an automated wafer inspection system that includes all but the strobing light limitations of claims 1 and 3 of the '6,298 patent. (See Def.'s Trial Ex. 295.) According to Camtek, this limitation is described in detail in the Moriya patent, which was also not considered by the Patent Examiner during prosecution of the '6,298 patent. (See Def.'s Trial Ex. 290.) As a result, Camtek argues that one of ordinary skill in the art would find that this prior art rendered August's '6,298 patent obvious.

An invention cannot be patented if “the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a);

see also KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 406 (2007). Nevertheless patents are presumed to be valid, and

[a] party seeking to invalidate a patent based on obviousness must demonstrate 'by clear and convincing evidence that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.

Proctor & Gamble Co. v. Teva Pharma. USA, Inc., 566 F.3d 989, 994 (Fed. Cir. 2009) (quotations omitted).

"The obviousness determination turns on underlying factual inquiries involving: (1) the scope and content of prior art, (2) differences between claims and prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations such as commercial success and satisfaction of a long-felt need." Id. (citing Graham v. John Deere Co., 383 U.S. 1, 17 (1966)); see also KSR, 550 U.S. at 406-07. The United States Supreme Court has also explained that the Federal Circuit's "teaching, suggestion or motivation" test provides helpful insight into obviousness as long as it is not rigidly applied. See KSR, 550 U.S. at 406.

In this case, the jury found that Camtek failed to prove by clear and convincing evidence that the '4,628 patent was invalid for obviousness. Although obviousness is a question of law, the Court is not free to simply

disregard the jury's findings of fact. See Hearing Components Inc. v. Shure Inc., 600 F.3d 1357, 1373 (Fed. Cir. 2010) ("We review the jury's conclusions on obviousness, a question of law, without deference, and the underlying findings of fact, whether explicit or implicit within the verdict, for substantial evidence.").

The Court presided over this trial wherein the parties submitted evidence on the issue of obviousness. Upon review of the testimony and exhibits offered with regard to the Chau and Moriya patents, the Court determines that it was reasonable for the jury to find that Camtek failed to prove obviousness by clear and convincing evidence. Specifically, the Court finds that the evidence presented was sufficient to show that the cited art failed to teach the claim element of strobing to freeze a pattern on a moving wafer and that a person of ordinary skill in the art would not have found it obvious to combine the Chau and Moriya prior art to obtain the '6,298 patent. (See e.g., Pls. Trial Exs. 370, 799; Trial Tr. at 308:4-20, 311:21-312:17, 327:4-19, 331:1-334:8, 341:2-343:13, 367:8, 516:12-517:24, 919:11-15, 921:13-16, 985:17-20, 997:11-1003:14, 1046:15-19, 1194:8-11, 1556:21-22, 1634:4-11, 1637:6-17, 1640:2-23, 1643:10-19, 1652:3-5, 1959:21-1960:10, 2071:5-14, 2081:20-2083:11-16, 2085:16-2087:7, 2091:16-25, 2437:5-8, 2440:7-14, 2441:11-2443:18, 2445:22-2446:17, 2447:17-2458:14.) Accordingly, the Court denies Camtek's request for JMOL as to invalidity. Furthermore, the

Court determines that there would be no miscarriage of justice if the jury's verdict is allowed to stand. As a result, the Court also denies Camtek's request for a new trial on obviousness.

E. Camtek's Rule 60 Motion for Clarification of the Order on Final Judgment and Injunctive Relief.

Camtek also requests that the Court to modify its Order on Final Judgment and Injunctive Relief [Docket No. 547] on the grounds that paragraphs 5(a) and 5(b) of the Order provide inconsistent guidance to Camtek on how to conduct its business operations under the Order.

The Court has reviewed the disputed provisions and has determined that they are indeed consistent. Paragraphs 5(a) and 5(b) enjoin Camtek from:

- a. communicating with third parties (in person, via phone, via email or by any other means) located in the United States for the purposes of offering to sell Falcon machines or machines that are colorable imitations thereof, notwithstanding where the third party intends to use the machines;
- b. advertising or marketing the Falcon machines or machines that are colorable imitations thereof in the United States unless it is made clear on the marketing or advertisements that Camtek's Falcon machines or machines that are colorable imitations thereof are not for sale or use in the United States.

(Order at 8, Aug. 28, 2009.) The Order explains exactly what an offer for sale is:

An offer for sale is any communication – such as an advertisement, brochure, price quotation, product manual, webpage, verbal offer for

sale, or the like – that contains sufficient information regarding the terms of sale for the Falcon machine and any machines that are colorable imitations thereof so as to constitute an offer under the applicable law.

(Id. at 7.)

To summarize, Paragraph 5(a) prohibits Camtek from communicating with third parties in the United States for the purpose of offering the Falcon for sale, regardless of the form of communication. Paragraph 5(b) requires advertising and marketing materials to have disclaimers which state that the infringing machines are not being offered for sale in the United States. Based upon this intended meaning, the Court finds no inconsistency between the two paragraphs.

The Court has already heard the parties' arguments with regard to a permanent injunction and made its ruling. The Court therefore declines to reopen argument on this issue and affirms the Order on Final Judgment and Injunctive Relief entered in this case. Accordingly, the Court denies Camtek's Rule 60 Motion for Clarification.

F. Camtek's Motion to Stay Enforcement of the Judgment

Next, Camtek requests that the Court stay proceedings to execute or enforce the Judgment pending resolution of post-trial motions [Docket No. 566].

Because the Court has now decided a second round of Camtek's post-trial motions, this request has been rendered moot and is therefore denied.

G. Attorney's Fees

In a letter to the Court dated May 5, 2010 [Docket No. 630], August withdrew its Motion for Attorneys' Fees as it is specifically related to statements made at trial involving the Court's claim construction. Nevertheless, August reserved the right to assert other grounds for attorney's fees in this matter as it deems appropriate. Specifically, August states that it is investigating whether Camtek is acting in compliance with the Court's injunction. Thus, while August withdraws its specific grounds to claim attorney's fees, it does not withdraw its Notice of Intent to Claim Attorney's Fees [Docket No. 549]. In light of this fact, the Court terminates August's Motion for Attorney's Fees [Docket No. 572].

III. CONCLUSION & ORDER

Based on the files, records, and proceedings herein **IT IS HEREBY**

ORDERED THAT:

1. Camtek's Motion for Judgment as a Matter of Law of No Literal Infringement of U.S. Patent No. 6,926,298 or, in the Alternative, for a New Trial on Literal Infringement [Docket No. 551] is **DENIED**.
2. Camtek's Motion for Judgment as a Matter of Law of No Lost Profits and a New Trial or Remittitur Regarding Reasonable Royalty [Docket No. 556] is **DENIED**.

3. Camtek's Motion for Judgment as a Matter of Law That the Asserted Claims of the '6,298 Patent are Invalid for Obviousness, or, in the Alternative, for a New Trial [Docket No. 561] is **DENIED**.
4. Camtek's Rule 60 Motion for Clarification of the Order on Final Judgment and Injunctive Relief [Docket No. 601] is **DENIED**.
5. Camtek's Motion to Stay Enforcement of the Judgment [Docket No. 566] is **DENIED AS MOOT**.
6. August's Motion for Attorney's Fees [Docket No. 572] is **TERMINATED**.

Date: July 25, 2010

s/ Michael J. Davis

Michael J. Davis

Chief Judge

United States District Court

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UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

AUGUST TECHNOLOGY CORPORATION, A
DELAWARE CORPORATION, AND RUDOLPH
TECHNOLOGIES, INC., A DELAWARE
CORPORATION,

PLAINTIFF,

v.

CAMTEK, LTD., A FOREIGN CORPORATION,

DEFENDANT.

CIVIL No. 05-1396 (MJD/AJB)

REPORT & RECOMMENDATION

Ernest W. Grumbles, III, Regina Vogel Culbert, Daniel W. McDonald, Heather J. Kliebenstein, Joseph E. Lee, and Rachel C. Hughey, Merchant & Gould PC, 80 South 8th Street, Suite 3200, Minneapolis MN 55402 (for Plaintiff);

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David R. Francescani, Edmond R. Bannon, John D. Garretson, and Michael F. Autuoro, Fish & Richardson, PC, 153 East 53rd Street, 52nd Floor, New York, NY 10022;

Donald L. Rhoads, Jean-Paul Ciardullo, and Jonathan S. Caplan (pro hac vice), Kramer Levin Naftalis & Frankel LLP, 1177 Avenue of the Americas, New York, NY 10036;

William A. LeMire, Arthur Chapman Kettering Smetak & Pikala, PA, 81 South 9th Street, Suite 500, Minneapolis, MN 55402-3214 (for Defendant).

I. INTRODUCTION

This matter is before the Court, Chief United States Magistrate Judge Arthur J. Boylan, on Plaintiff's Brief in Support of Request for Supplemental Damages [Docket No. 627]. This matter was referred to this Court for proposed findings of fact and recommendations of law

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pursuant to 28 U.S.C. § 636(b)(1)(B). [Docket No. 655.] A hearing was held on the motion on November 1, 2010. Daniel W. McDonald, Earnest Grumbles, and Joseph Lee appeared on behalf of Plaintiff. Christopher Colvin, Jonathan Caplan, and William LeMire appeared on behalf of Defendant.

Based upon the record, memoranda, and oral arguments of counsel, **IT IS HEREBY RECOMMENDED** that Plaintiff's Brief in Support of Request for Supplemental Damages [Docket No. 627] be **GRANTED IN PART** and **DENIED IN PART**.

II. BACKGROUND

Plaintiff August Technology Corporation filed its Complaint on July 14, 2005. [Docket No. 1.] There was no motion for preliminary injunction in this action. The jury trial in this matter commenced on February 2, 2009, [Docket No. 406] and concluded on March 5, 2009. [Docket No. 465.] On March 5, 2009, the jury returned a verdict in favor of Plaintiff and found that Plaintiff is entitled to \$6,782,490.00 in lost profits damages. [Docket No. 466.] The designated area for reasonable royalties on the special verdict form was left blank by the jury.

On August 28, 2009, the Honorable Michael J. Davis, Chief United States District Court Judge for the District of Minnesota, issued Order on Final Judgment and Injunctive Relief. [Docket No. 547]. The August 28, 2009 Order directed, based on the jury's verdict, that a judgment of infringement, validity, and enforceability of the asserted claims be entered and the Order also granted Plaintiff's Motion for Permanent Injunction. In addition, Chief Judge Davis ordered that "[Plaintiff] is entitled to an accounting for all Falcon sales, if any, since September 2008." (*Id.* at 4.)

On July 27, 2010, Chief Judge Davis issued an Order [Docket No. 644] on Defendant's Motion for Judgment as a Matter of Law of No Lost Profits and a New Trial or Remittitur

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Regarding Reasonable Royalty, in which Defendant “contend[ed] that the jury’s award of \$6,782,490 in lost profits was unsupported by substantial evidence because there were more than two suppliers in the wafer inspection industry during the relevant period.” (Mem. of Law & Order, 11, July 27, 2010.) Chief Judge Davis extensively reviewed the record, see *id.* at 12-13, and concluded that Plaintiff presented evidence supporting the jury’s lost profits award. Chief Judge Davis concluded:

First, August presented evidence showing that, but for Camtek’s infringement, there is a reasonable probability that August would have made the infringing sales. Second, August presented evidence indicating that it would have made the sales because the market is a two-supplier market. Finally, August presented evidence showing that, even if it was not a two-supplier market, August held at least 60% of the market share. In this case, the lost profits award equates to less than 100% of Camtek’s sales. Based on the exhibits and testimony presented at trial, the Court finds sufficient evidence to support the jury’s award of lost profits in the amount of \$6,782,490 to August.

(*Id.* at 13.) Therefore, Defendant’s Motion for Judgment as a Matter of Law of No Lost Profits and a New Trial or Remittitur Regarding Reasonable Royalty was denied. (*Id.*)

Subsequently, Plaintiff identified four infringing sales that were not part of the evidence offered at trial. [Docket No. 628]. The sales were as follows: (1) September 20, 2008, for \$740,000; (2) November 20, 2008, for \$1,144,524; (3) January 26, 2009, for \$640,666; and (4) May 29, 2009, for \$234,960. The total sales revenue on the four infringing sales was \$2,760,150. Plaintiff brings the present motion seeking accounting of these sales and an award of supplemental damages consistent with the August 28, 2009 Order. Defendant opposes the motion.

III. DISCUSSION

Pursuant to a district court's discretion to assess and compute damages under 35 U.S.C. § 284, a district court has discretion to award supplemental damages "[f]or infringing activity done after an infringement verdict and damage award is rendered and before final judgment is entered." Robert A. Matthews, Jr. 4 ANNOTATED PATENT DIGEST § 30:140.50 (Nov. 2010). This Court has thoroughly reviewed the authority on post-verdict accounting of damages. *See, e.g., Maxwell v. J. Baker, Inc.*, 879 F. Supp. 1007, 1011 (D. Minn. 1995), *rev'd on other grounds*, 86 F.3d 1098 (Fed. Cir. 1996) (accounting for sales during period not considered by finder of fact); *see also Hynix Semiconductor Inc. v. Rambus Inc.*, 609 F. Supp.2d 951, 960-61 (N.D. Cal. 2009) (examining the authority concerning supplemental damages and concluding that 35 U.S. § 284 permits supplemental damages); *Stryker Corp. v. Davol, Inc.*, 75 F. Supp.2d 746, 747 (W.D. Mich. 1999), *aff'd* 234 F.3d 1252 (Fed. Cir. 2000) (awarding supplemental damages based upon the reasonable royalty rate found by the jury); *Oscar Mayer Foods Corp. v. Conagra, Inc.*, 869 F. Supp. 656, 668 (W.D. Wis. 1994) (awarding supplemental damages "on the basis of product sales which occurred after the entry of judgment at the [set percentage] rate of . . . post-judgment sales revenue based upon extrapolation from the jury's verdict").

Accounting of supplemental damages requires a three-step analysis: First, the court must determine the period of time considered by the finder of fact and the period of time for accounting. Second, the court must determine whether or not there was an alleged infringing act that occurred during the period of time for accounting. As part of this second inquiry, the court may conclude that the determination of whether or not there was an infringing act is better suited for a separate litigation. Finally, if the court finds that there was an infringing act that occurred

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during the period of time for accounting, then the Court must identify and apply a method for computing damages for the infringing act.

a. The Time Period at Issue & Defendant's Alleged Acts Infringement

In the present case, Chief Judge Davis has already set the period of time for accounting: Plaintiff is entitled to accounting for the period of September 1, 2008, to the date Judgment was entered. Furthermore, Chief Judge Davis's Order on Final Judgment and Injunctive Relief states that Plaintiff "is entitled to an accounting for all *Falcon* sales." (Order on Final Judgment and Injunctive Relief, at 4 (emphasis added); *see also* Special Verdict Form, 1-3 (referring to "Camtek's Falcon device" and "every Falcon device accused of infringement"); *see also* Tr. 2806:23-2808:16; [Docket No 552].) This Court does not read Defendant's arguments in opposition to Plaintiff's motion to contest that all four sales constitute "Falcon sales" or infringing device sales. Therefore, this Court considers all four sales to be infringing sales for the purpose of the supplemental damages analysis.

b. Method for Computing Damages

i. Should this issue be considered at the present time?

When Defendant originally briefed this issue, Defendant argued that Plaintiff's request for supplemental damages was premature because Chief Judge Davis was still considering Defendant's Motion for Judgment as a Matter of Law of No Lost Profits and a New Trial or Remittitur Regarding Reasonable Royalty. Since the briefing on the issue of supplemental damages was complete, but before this Court heard Plaintiff's motion on supplemental damages, Chief Judge Davis denied Defendant's Motion for Judgment as a Matter of Law of No Lost Profits and a New Trial or Remittitur Regarding Reasonable Royalty. Therefore, this argument is rejected as moot.

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In Defendant's Motion to Limit Discovery in Light of the Federal Circuit's *Transocean* Decision and to Stay Supplemental Damages Proceedings, Defendant contends that staying the supplemental damages decision is warranted because Chief Judge Davis stayed judgment in this matter and Defendant believes that it is likely to prevail on appeal, which will render the supplemental damages issue moot. (Camtek's Mot. to Limit Discovery 10-11, Sept. 22, 2010.) This Court is not persuaded by this argument because the minimal prejudice to proceeding at this juncture is that Defendant may need to post an additional supersedeas bond.

ii. How should the Court calculate damages?

The parties' primary dispute concerns the method of computation. Where there is a jury finding concerning the rate of royalty, courts often apply that rate. *Stryker Corp.*, 75 F. Supp. 2d at 747; *Oscar Mayer Foods Corp.*, 869 F. Supp. at 668. Where there is no finding on the issue of royalties, some courts have extrapolated a per unit rate of damages. See, e.g., *Presidio Components Inc. v. American Technical Ceramics Corp.*, No. 08-CV-335-IEG (NLS), 2010 WL 3070370, at *2 (S.D. Cal. Aug. 5, 2010); see also *Presidio Components Inc. v. American Technical Ceramics Corp.*, No. 08-CV-335-IEG (NLS), 2010 WL 1462757, at *37 (S.D. Cal. Apr. 13, 2010). At least one court reached a damage rate by dividing the damage award by the total sales presented at trial. *Aero Products Intern., Inc. v. Intex Recreation Corp.*, No. 02 C 2590, 2005 WL 1498667, *2 (N.D. Ill. 2005). All of the cases suggest that a determination that is consistent with the verdict is presumptively reasonable under 35 U.S.C. § 285.

There is no dispute that the jury awarded lost profits in the amount of \$6,782,490. To reach this conclusion the jury found a causal connection between the infringement and Plaintiff's loss of profits. But, the verdict form does not explicitly indicate whether the jury found a

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multiple-supplier market or a two-supplier market, or what the jury found Plaintiff's lost profits to be on a per unit basis.

Plaintiff argues that Defendant earned \$2,760,150 from the four-infringing sales that occurred during the period of time for accounting. (Aff. McCloskey, Ex. 1 (Apr. 27, 2010) [Docket No. 628]; *see also* [Docket No. 627].) Plaintiff argues that the most appropriate calculation for a supplemental damages award is the ratio of the awarded damages to the total infringing sales (or the jury award of \$6,782,490 in damages to Defendant's \$22,894,110 in revenue for infringing sales). Thus, Plaintiff suggests that the Court award \$817,832 (or 29.63 percent of \$2,760,150) in supplemental damages.

Defendant contends that Plaintiff is erroneously calculating supplemental damages based upon Defendant's revenue. Plaintiff chose to calculate a rate for damages that is based upon lost profits to total infringing sales. But, there are other methods for calculating a rate of damages. This Court identified two other rates: First, there was evidence to support a two-supplier market; there was evidence of 36 infringing sales; and therefore, it can be concluded that the jury awarded Plaintiff \$188,402 per sale and that rate could apply to each of the four infringing sales at issue in the present motion. Second, there was evidence of a multiple-supplier market; there was evidence that Plaintiff controlled at least 60 percent of the market; 60 percent of 36 sales is 21 complete sales; and therefore, it can be concluded that the jury awarded Plaintiff \$322,975 per sale based upon 21 complete sales and that rate could be applied to two of four the infringing sales at issue in the present motion.¹

The role of the Court at this juncture is to determine a methodology for calculating supplemental damages that is reasonable. It is reasonable to use a calculation method that is

¹ The damage award of \$6,782,490 divided by 21 infringing sales equals a damage award of \$322,975.714 per infringing sale.

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consistent with the jury's findings. This Court could apply Plaintiff's method, which yields a supplemental damage award of \$817,832 for all four of the infringing sales; this Court could apply a two-supplier market calculation, which yields a supplemental damage award of \$753,610 (or \$188,402 multiplied by four) for all four of the infringing sales; or (3) this Court could apply a multiple-supplier market calculation, which yields a supplemental damages award of \$645,946 (or \$322,973 multiplied by two infringing sales) based upon two of the four infringing sales.

This Court concludes that the multiple-supplier market calculation method is the most reasonable rate to apply. At trial, Plaintiff sought lost profits of \$322,973 per infringing sale. Plaintiff presented evidence of a two-supplier market and a multiple-supplier market. The jury awarded Plaintiff \$6,782,490 in damages. It is a reasonable interpretation of the jury's verdict to conclude that the jury awarded Plaintiff damages for 21 complete infringing sales (or a 60-percent share of the infringing sales market) at a per unit rate of \$322,975. Thus, it is reasonable to apply this rate and the multiple-market calculation to the infringing sales that occurred during the time period for accounting.

Defendant contends that any damage rate should only be applied to one sale because the \$234,960 sale was a demo machine, the \$640,666 sale was to a customer that previously chose a third-party manufacturer over Plaintiff, and the \$1,144,524 sale contained 3D technology superior to Plaintiff's products. Therefore, Defendant contends that Plaintiff cannot show "but for" causation as to these three sales. First, Defendant's argument disregards the jury's apparent conclusion that Plaintiff met its burden of proving "but for" causation. Second, there is evidence to support that the jury considered and rejected all of these arguments.

Therefore, this Court recommends that that Plaintiff be awarded supplemental damages in the amount of \$645,946 (or \$322,973 per infringing sale for two infringing sales). A per-

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infringing-sale rate of \$322,973 is reasonable because it reflects the amount of per unit damages Plaintiff sought at trial and it also reflects the approximate rate that the jury awarded to Plaintiff based upon a multiple-supplier market theory. Applying a per-infringing-sale rate of \$322,973 to two infringing sales is reasonable because two complete sales reflects the jury's apparent finding that Plaintiff controls approximately 60 percent of a multiple-supplier market.

IV. PROPOSED FINDINGS

- a. The period of time at issue for the purpose of accounting is September 1, 2008, to the entry of Judgment.
- b. Defendant made four infringing sales between September 1, 2008, and the entry of Judgment.
- c. The most reasonable calculation of supplemental damages based upon the jury's verdict is to apply a per-infringing-sale rate of \$322,973 to two of the infringing sales during the period of time for accounting.

V. RECOMMENDATION

Based upon the record, memoranda, and oral arguments of counsel, **IT IS HEREBY RECOMMENDED** that Plaintiff's Brief in Support of Request for Supplemental Damages [Docket No. 627] be **GRANTED IN PART** and **DENIED IN PART** as follows:

1. Plaintiff be awarded supplemental damages in the amount of \$645,946;
2. Plaintiff be granted leave to bring such additional motions for supplemental damages as are supported by Plaintiff's post-verdict discovery; and
3. Plaintiff's motion be denied in all other respects.

Dated: 11/17/10

s/ Arthur J. Boylan
Chief Magistrate Judge Arthur J. Boylan
United States District Court

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Pursuant to Local Rule 72.2(b), any party may object to this Report and Recommendation by filing with the Clerk of Court and by serving upon all parties written objections that specifically identify the portions of the Report to which objections are made and the basis of each objection. This Report and Recommendation does not constitute an order or judgment from the District Court and it is therefore not directly appealable to the Circuit Court of Appeals. Written objections must be filed with the Court before December 2, 2010.

UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

August Technology Corporation,
a Delaware corporation, and
Rudolph Technologies, Inc., a Delaware
corporation,

Plaintiffs,

ORDER

Civil File No. 05-1396 (MJD/AJB)

v.

Camtek Ltd., a foreign corporation,

Defendant.

The above-entitled matter comes before the Court upon the Report and Recommendation of Chief United States Magistrate Judge Arthur J. Boylan dated November 17, 2010. [Docket No. 683]. Defendant Camtek has filed objections to the Report and Recommendation. [Docket No. 688]. Pursuant to statute, the Court has conducted a de novo review of the record, including all transcripts filed and exhibits submitted to the Court. 28 U.S.C. § 636(b)(1); Local Rule 72.2(b). Based upon that review, the Court **ADOPTS** the Report and Recommendation, with the exception that, in the last sentence of the second

paragraph on page 6 of the Report and Recommendation the language "35 U.S.C. § 285" is replaced with "35 U.S.C. § 284".

Accordingly, based upon the files, records, and proceedings herein, **IT IS HEREBY ORDERED** that:

1. The Court **ADOPTS** the Magistrate Judge's Report and Recommendation dated November 17, 2010 [Docket No. 683].
2. Plaintiff's Brief in Support of Request for Supplemental Damages [Docket No. 627] is **GRANTED IN PART** and **DENIED IN PART** as follows:
 - a. Plaintiff is awarded supplemental damages in the amount of \$645,946;
 - b. Plaintiff is granted leave to bring such additional motions for supplemental damages as are supported by Plaintiff's post-verdict discovery; and
 - c. Plaintiff's motion is denied in all other respects.

Dated: January 7, 2011

s/ Michael J. Davis
Michael J. Davis
Chief Judge
United States District Court

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**UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

August Technology Corporation,
and Rudolph Technologies, Inc.,

Civil No. 05-1396 MJD/AJB

Plaintiff

v.

REPORT & RECOMMENDATION

Camtek Ltd.,

Defendant.

Daniel W. McDonald, Esq., Joseph E. Lee, Esq., and Ernest W. Grumbles, Esq. for the plaintiffs,
August Technology Corporation and Rudolph Technologies, Inc.

Jonathan S. Caplan, Esq., Christopher A. Colvin, Esq., William A. LeMire Esq., for the
defendant, Camtek Ltd.

Pursuant to 28 U.S.C. § 636(b)(1)(B) [Docket No. 721] this matter was referred to the undersigned, Chief Magistrate Judge Arthur J. Boylan, by the Honorable Michael J. Davis, Chief Judge, for a Report & Recommendation on the motion of plaintiffs August Technology Corporation and Rudolph Technologies, Inc. for contempt. Oral argument was heard on May 27, 2011 at the U.S. Courthouse, 300 South Fourth Street, Minneapolis, MN 55415.

For the following reasons, the undersigned magistrate judge recommends that the motion for contempt be granted.

REPORT

I. Findings of Fact

The facts are undisputed. Plaintiffs and defendant manufacture machines that

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automatically inspect integrated circuits made on semiconductor wafers. In July 2005, plaintiffs brought this action alleging patent infringement. The matter was tried to a jury, and on March 5, 2009, the jury found plaintiffs' patent was valid and infringed by defendant's Falcon brand machines. The jury found the infringement was not willful. At trial plaintiffs presented evidence that they held at least a 60% market share in a multi-player market; the jury awarded plaintiffs lost profits of \$6,782,490 through October 2008, consistent with a 60% share of a multi-player market.

On March 9, 2009, defendant notified its sales force of what it called the "preliminary verdict," urging them to "emphasize [to customers] that this process is not over and no judgment has been made." Ciardullo Damages Decl. [Docket No. 725] Ex. A at SEMITEXPV005301. On March 12, 2009, plaintiffs informally requested updated information on defendant's sales of Falcon machines since October 2008, and advised defendant they would consider any post-verdict sales of Falcon machines to be willful infringement. Defendant responded that it "disagree[d] with [plaintiffs'] 'position' that any sales of Falcons post-verdict are acts of willful infringement." [Docket No. 636, Ex. 1 at 5.] On March 19, 2009, defendant filed the first in a series of post-trial motions seeking to overturn the verdict [Docket No. 470]. Defendant also issued a press release stating its position – maintained consistently since the trial – that there was no infringement and the "unjust verdict" would eventually be vacated or reversed. Ciardullo Damages Decl. Ex. A at SEMITEXPV005302.

On August 28, 2009, the court ruled on the parties' post-trial motions, entered judgment for plaintiffs on the jury verdict, and determined that, based on the facts established at trial, there was no need for further trial on the defense of inequitable conduct, which had been reserved for a

bench trial [Docket No. 545]. The court also issued a permanent injunction enjoining defendant from, among other things, “communicating with third parties (in person, via phone, via email or by any other means) located in the United States for the purposes of offering to sell Falcon machines or machines that are colorable imitations thereof, notwithstanding where the third party intends to use the machines[.]” Injunction ¶ 5(a) [Docket No. 547].

The parties filed yet more post-trial motions, most of which were ultimately denied.¹ Meanwhile, defendant continued to communicate with customers in the United States about selling Falcon machines overseas. In late September 2009, Mr. Rollo met with employees of Morgan PLC (“Morgan”) at Morgan’s Ohio headquarters. At his deposition, Mr. Rollo confirmed that he had discussed the sale of a Falcon machine at the meeting. Lee Contempt Decl. [Docket No. 718] Ex. B. The following week he emailed the employees with a quote on a non-infringing machine. The email added that “The Falcon quote will come out of Asia since it is being purchased in Asia for Asia.” *Id.*, Ex. A. In December 2009, after additional communications with Morgan employees, Mr. Rollo emailed to Morgan’s Ohio headquarters a quote on a Falcon machine to be delivered to Malaysia. *Id.*, Ex. D. Morgan later purchased the Falcon machine for \$652,557. *Id.*, Ex. E. In November 2009, Tommy Weiss, the vice president of Camtek USA, emailed his sales contact at Cree, a customer headquartered in North Carolina, offering to sell a Falcon machine for use in China for \$756,000. *Id.*, Exs. F, G. Cree later purchased the machine. *Id.*, Ex. K.

¹ On September 14, 2009, defendant filed another round of post-trial motions seeking judgment as a matter of law [Docket Nos. 551, 556, 561] and also to stay execution of the judgment [Docket No. 566]. The Court granted the motion to stay execution. Plaintiffs moved for attorney’s fees [Docket No. 572].

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On October 30, 2009, while the Morgan sales negotiations were in progress, defendant moved to clarify the injunction, seeking to modify paragraph 5(a) to eliminate the “notwithstanding” clause, which would allow it to communicate with customers in the United States who intended to use the machines overseas [Docket No. 602]. The court denied the motion, along with most of the parties’ other post-trial motions, on July 27, 2010 [Docket No. 644]. The following day, defendant moved to limit plaintiffs’ request for discovery related to supplemental damages on the grounds that overseas sales did not infringe [Docket No. 645]. Defendant also appealed the injunction [Docket No. 650] and sought a stay from the Federal Circuit pending appeal [Docket No. 669]; the stay was denied, see August Tech. Corp. v. Camtek, Ltd., 395 Fed. Appx. 692, 693 (Fed. Cir. 2010) (unpublished), and the appeal remains pending.

Plaintiffs sought additional discovery on defendant’s post-injunction sales [Docket No. 634]. Defendant opposed the discovery, and after rulings from the court, produced documents in January and February 2011 which revealed the two post-injunction sales. Plaintiffs have presented evidence that defendant received \$652,557 on the Morgan sale and \$756,000 on the Cree sale. Lee Contempt Decl. Exs. E, F, G, K. Plaintiffs now move the court to find defendant in contempt of the injunction and to impose sanctions.

II. Conclusions of Law

In patent disputes as in other areas of law, courts have “inherent authority to enforce their own injunctions” through contempt proceedings. Abbott Labs. v. TorPharm, Inc., 503 F.3d 1372, 1379 (Fed. Cir. 2007). A party moving for civil contempt must show “(1) the offending party violated an order of the court; (2) the violation was more than de minimis or technical

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noncompliance; and (3) the conduct was not the product of a good faith or reasonable interpretation of the order.” Navajo Nation v. Peabody Coal Co., 7 Fed. Appx. 951, 955 (Fed. Cir. 2001) (unpublished). The movant must prove by clear and convincing evidence that the order has been violated. Preemption Devices, Inc. v. Minnesota Mining & Mfg. Co., 803 F.2d 1170, 1173 (Fed. Cir. 1986). “The general rule in civil contempt is that a party need not intend to violate an injunction to be found in contempt.” Additive Controls & Measurement Sys. Inc. v. Flowdata, Inc., 154 F.3d 1345, 1353 (Fed. Cir. 1998). However, a plain reading of the order must put the enjoined party on notice of what acts are prohibited. Travelers Indem. Co. v. Bailey, 129 S. Ct. 2195, 2204 (2009). “If there is a fair ground of doubt” as to whether the order has been violated, the court should not find contempt. Preemption Devices, 803 F.2d at 1173.

Paragraph 5(a) of the injunction prohibits defendant from “communicating with third parties (in person, via phone, via email or by any other means) located in the United States for the purposes of offering to sell Falcon machines or machines that are colorable imitations thereof, *notwithstanding where the third party intends to use the machines[.]*” Injunction ¶ 5(a) (emphasis added). Defendant does not dispute that it communicated with Morgan and Cree’s United States representatives after the injunction was entered in order to sell Falcon machines for delivery in Asia. In its defense, defendant advances three arguments: (1) the injunction does not cover its conduct; (2) the injunction is vague; and (3) the injunction exceeds the court’s authority. All three arguments rest on a common premise: that the United States patent laws do not reach an offer made in the United States to sell a product for delivery overseas.

The United States patent statute provides that “whoever without authority makes, uses, offers to sell, or sells any patented invention within the United States . . . infringes the patent.”

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35 U.S.C. § 271(a). “It is the general rule under United States patent law that no infringement occurs when a patented product is made and sold in another country.” Microsoft Corp. v. AT&T Corp., 550 U.S. 437, 441 (2007). At the time of the Morgan and Cree sales, the Federal Circuit had not yet determined whether the location of the offer, or the location of the sale, controlled the infringement analysis. Shortly after defendant appealed the injunction in this matter, the Federal Circuit construed the phrase “offers to sell . . . within the United States,” holding that “the location of the contemplated sale controls whether there is an offer to sell within the United States.” Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc., 617 F.3d 1296, 1309 (Fed. Cir. 2010). In Transocean, the infringer and a third party, both U.S. companies, met in Norway to negotiate a contract to sell a product for delivery in the United States. The Federal Circuit found such conduct “may constitute an offer to sell within the U.S. under § 271(a).” Id. at 1310.

Defendant argues, in essence, that it cannot be held in contempt of the court’s injunction unless overseas Falcon sales infringe plaintiffs’ patent. But that is not the court’s inquiry. The issue is not whether overseas sales infringe, but rather, whether defendant’s conduct in pursuing and making those sales violated the injunction.

Defendant first argues that paragraph 5(a) of the injunction does not prohibit its communications with Morgan and Cree, because those communications did not concern an “offer for sale” prohibited by the U.S. patent laws. The injunction elsewhere defines “offer for sale” as “any communication – such as an advertisement, brochure, price quotation, product manual, webpage, verbal offer for sale, or the like – that contains sufficient information regarding the terms of the sale for the Falcon machine . . . so as to constitute an offer under the

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applicable law.” Injunction ¶ 4. Defendant suggests this definition limits paragraph 5(a)’s reach to communications for the purpose of making an “offer under the applicable law.” Because, in defendant’s view, an offer to sell a Falcon machine for delivery overseas is not an “offer to sell within the United States” under 35 U.S.C. § 271(a), it is not an “offer under the applicable law,” and therefore is not prohibited by the injunction.

The court disagrees with defendant’s strained reading. Paragraph 5(a) bars “communicating with third parties (in person, via phone, via email, or by any other means) located in the United States for the purposes of offering to sell Falcon machines . . . notwithstanding where the third party intends to use the machines.” Injunction ¶ 5(a). This language is clear and unambiguous: the prohibited acts are communications, made by defendant to third parties located in the United States, for the purpose of offering to sell Falcon machines that may be used in the United States or elsewhere. The “notwithstanding” clause explicitly contemplates sales of machines that may be delivered outside the United States.

Defendant admits that in fall 2009 it communicated with Morgan and Cree representatives in the United States and offered to sell Falcon machines for delivery overseas. By its plain terms, paragraph 5(a) of the injunction reaches defendant’s conduct. “[W]here the plain terms of a court order unambiguously apply, as they do here, they are entitled to their effect.” Travelers Indem. Co., 129 S.Ct. at 2204.

Defendant next argues this prohibition cannot be enforced because it is vague and ambiguous. “[T]he judicial contempt power is a potent weapon that cannot be founded upon ‘a decree too vague to be understood.’” TiVo Inc. v. EchoStar Corp., No. 2009-1374, 2011 WL 1486162, *10 (Fed. Cir. April 20, 2011) (quoting Int’l Longshoremen’s Ass’n v. Phila. Marine

Trade Ass'n, 389 U.S. 64, 76 (1967)). While “in certain circumstances vagueness can operate as a defense to contempt,” “where a party faced with an injunction perceives an ambiguity in the injunction, it cannot unilaterally decide to proceed in the face of the injunction and make an after-the-fact contention that it is unduly vague.” TiVo, 2011 WL 1486162, *10.

In essence, defendant argues that even if the injunction did not actually allow it to communicate with Morgan and Cree, it could reasonably be viewed as allowing those communications. The court disagrees. Paragraph 5(a) directs defendant not to communicate with third parties in the United States for the purpose of offering to sell Falcon machines, without regard to where those machines will be used. Defendant’s strained reading – that the prohibition reaches only communications directed to U.S. sales – flatly contradicts both the plain text and the history of the injunction.

Defendant argued offers to sell Falcon machines outside the United States did not infringe and should not be enjoined [See Docket No. 528 at 19-21]. The court rejected this argument and included the “notwithstanding” clause in paragraph 5(a). Defendants chose to ignore the plain language of that clause and began communicating with Morgan in late September about selling a Falcon overseas. About a month into these negotiations, defendant asked the court to clarify or modify the injunction and strike the “notwithstanding” clause, raising the same arguments the court had previously rejected [Docket No. 602]. Defendant did not wait for clarification, however, but continued communicating with Morgan representatives and also began communicating with Cree representatives about overseas Falcon sales.

There is nothing vague or ambiguous about paragraph 5(a) of the injunction. The “notwithstanding” clause expressly prohibits defendant from making the sort of communications

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it made to Morgan and Cree in the fall of 2009. The court finds paragraph 5(a) sufficiently advises defendant of what activities are prohibited, and the injunction is not too vague or ambiguous to be enforced.

Defendant's final argument is that the "notwithstanding" clause, if it bars communications related to foreign sales, exceeds the court's authority. Defendant has repeatedly made this argument, and it has been consistently rejected. It must be rejected again. "The time to appeal the scope of an injunction is when it is handed down, not when a party is later found to be in contempt." TiVo, 2011 WL 1486162, *13. Defendant sought modification from the court, and was denied; the issue is now before the Federal Circuit.

In the meantime, the injunction remains in force. Even if the Federal Circuit ultimately adopts defendant's position, defendant may still be liable for prior communications that violated the injunction. An injunction's validity is to be decided by the court, not the parties. See United States v. United Mine Workers, 330 U.S. 258, 294 (1947). Until the court's decision is reversed, its orders are to be respected. Id. Violations of an order may be punishable as contempt even though the order is later reversed on appeal. Id.

Accordingly, the court concludes that the 2009 communications related to the Morgan and Cree sales violated the injunction. "Judicial sanctions in civil contempt proceedings may, in a proper case, be employed for either or both of two purposes: to coerce the defendant into compliance with the court's order, and to compensate the complainant for losses sustained." Spindelfabrik Suessen-Schurr v. Schubert & Salzer Maschinenfabrik Aktiengesellschaft, 903 F.2d 1568, 1578 (Fed. Cir. 1990). Plaintiffs have presented evidence that defendant's prohibited communications led to two Falcon sales, the Morgan sale at \$652,557 and the Cree sale at

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\$756,000. Applying the figures previously determined in its Report & Recommendation [Docket No. 681], the court finds plaintiffs lost \$322,973 in profits for each machine, for a total of \$645,946.

The court recommends an award of double damages. The language of the injunction is clear, and the injunction has yet to be modified by either this court or the Federal Circuit. Defendant argued for an injunction which did not reach offers to sell overseas, but the court did not adopt its position. Defendant then chose to disregard the plain text of the injunction and communicate with Morgan. A month into those negotiations, defendant sought clarification and modification of the injunction in this court – yet proceeded to consummate both the Morgan and Cree transactions without waiting for the court to rule on its motion.

The court also recommends an award of attorney's fees and costs. Attorney's fees may be appropriate in civil contempt proceedings arising from contempt of an order enjoining infringement of a patent. See Siebring v. Hansen, 346 F.2d 474, 480 (8th Cir. 1965). Here, the expense of bringing this motion for contempt constitutes part of plaintiffs' damages. Accordingly, the court recommends an award of attorney's fees and costs in an amount to be determined, based on further submission of the plaintiffs.

RECOMMENDATION

Based upon the foregoing Findings and Conclusions, the undersigned magistrate judge recommends that:

1. Plaintiffs' Motion For Contempt [Docket No. 715] be granted.
2. Defendant be ordered to pay plaintiffs \$1,291,892, reflecting double damages, as a sanction for contempt.

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3. Plaintiffs be awarded award of attorney's fees and costs in an amount to be determined by the court, reflecting fees incurred in bringing the instant motion for contempt.

Dated: August 11, 2011

s/ Arthur J. Boylan
The Hon. Arthur J. Boylan
United States Chief Magistrate Judge

Pursuant to Local Rule 72.2(b), any party may object to this Report and Recommendation by filing with the Clerk of Court, and by serving upon all parties, written objections which specifically identify the portions of the Report to which objections are made and the bases for each objection. This Report and Recommendation does not constitute an order or judgment from the District Court and it is therefore not directly appealable to the Circuit Court of Appeals. Written objections must be filed with the Court before **September 1, 2011**.

Unless the parties stipulate that the District Court is not required by 28 U.S.C. § 636 to review a transcript of the hearing in order to resolve all objections made to this Report and Recommendation, the party making the objections shall timely order and file a complete transcript of the hearing within ten days of receipt of the Report.

**UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

August Technology Corporation,
and Rudolph Technologies, Inc.,

Civil No. 05-1396 MJD/AJB

Plaintiff

v.

ORDER

Camtek Ltd.,

Defendant.

Daniel W. McDonald, Esq., Joseph E. Lee, Esq., and Ernest W. Grumbles, Esq. for the plaintiffs,
August Technology Corporation and Rudolph Technologies, Inc.

Jonathan S. Caplan, Esq., Christopher A. Colvin, Esq., William A. LeMire Esq., for the
defendant, Camtek Ltd.

This matter is before the court on motion of plaintiffs August Technology Corporation
and Rudolph Technologies, Inc. for enhanced damages. Oral argument was heard on May 27,
2011 at the U.S. Courthouse, 300 South Fourth Street, Minneapolis, Minnesota 55415.

For the following reasons, the motion for enhanced damages is denied.

I. Background

The relevant facts are undisputed. Plaintiffs and defendant manufacture machines that
automatically inspect integrated circuits made on semiconductor wafers. In July 2005, plaintiffs
brought this action alleging patent infringement. The matter was tried to a jury, and on March 5,
2009, the jury found plaintiffs' patent was valid and infringed by defendant's Falcon brand
machines. The jury found the infringement was not willful. At trial plaintiffs presented

evidence that they held at least a 60% market share in a multi-player market; the jury awarded plaintiffs lost profits of \$6,782,490 through October 2008, consistent with a 60% share of a multi-player market.

On March 9, 2009, defendant notified its sales force of what it called the “preliminary verdict,” urging them to “emphasize [to customers] that this process is not over and no judgment has been made.” Ciardullo Damages Decl. [Docket No. 725] Ex. A at SEMITEXPV005301. On March 12, 2009, plaintiffs informally requested updated information on defendant’s sales of Falcon machines since October 2008, and advised defendant they would consider any post-verdict sales of Falcon machines to be willful infringement. Defendant responded that it “disagree[d] with [plaintiffs’] ‘position’ that any sales of Falcons post-verdict are acts of willful infringement.” [Docket No. 636, Ex. 1 at 5.] On March 19, 2009, defendant filed the first in a series of post-trial motions seeking to overturn the verdict [Docket No. 470]. Defendant also issued a press release stating its position – maintained consistently since the trial – that there was no infringement and the “unjust verdict” would eventually be vacated or reversed. Ciardullo Damages Decl. Ex. A at SEMITEXPV005302.

On April 10, 2009, about five weeks after the verdict, defendant’s representatives contacted Infinera, a California customer. Defendant offered to sell an infringing Falcon 200 machine that had been built in 2004 and had been used as a demonstration model. In an exchange of internal communications, defendant’s representatives – who had previously been advised of the jury verdict – agreed to offer Infinera a “rock bottom price” that would “hurt Rudolph.” Defendant sold the machine to Infinera on May 22, 2009 for \$234,960, a price below cost. Jason Rollo, the representative who suggested “hurt[ing]” plaintiffs with a “rock bottom

price,” later described the sale as a financial “disaster.” Lee Damages Decl. [Docket No. 712] Exs. A-E.

In a letter dated June 8, 2009, defendant’s counsel represented to plaintiffs that defendant “has not made any sales of the Falcon in the United States” since trial started in February 2009. [Docket No. 636-1 at 13-14; 642-1, Ex. 5] Due to the Infinera sale, this representation turned out to be false.¹

The parties made post-trial motions and litigated the scope of the court’s injunction, which issued on August 28, 2009 [Docket No. 547]. Plaintiffs later sought an award of supplemental damages for four Falcon sales that had not been presented to the jury [Docket No. 627]. One of these was the Infinera sale. On November 17, 2010, the undersigned magistrate judge recommended an award of \$645,946 in damages, reflecting 60% of the total sales amount [Docket No. 683] (“Report & Recommendation”). The Report and Recommendation was adopted on January 7, 2011 [Docket No. 707].

Plaintiffs also sought additional discovery on defendant’s post-verdict sales [Docket No. 634]. Defendant opposed the discovery, and after rulings from the court, produced documents in January and February 2011 which revealed more details of the post-verdict sale to Infinera. As a result of these findings plaintiffs now move the court for an award of enhanced damages.

II. Analysis

Defendant does not dispute that it sold an infringing Falcon machine in the United States

¹ Defendant later disclosed the Infinera sale to plaintiffs by letter dated February 12, 2010 [Docket No. 642-1, Ex. 7.] When plaintiffs inquired further, defendant assured plaintiffs by letter dated April 5, 2010 that it had initiated discussions with Infinera prior to the verdict. [Docket No. 642-1, Ex. 9]. This representation also turned out to be false. Defendant attributes its misrepresentations to an inadvertent failure to communicate and also to a change of counsel.

after the verdict but before the injunction issued. The analysis therefore centers on whether such activity entitles plaintiffs to further relief.

Plaintiffs have already received compensatory damages for the infringing Infinera sale; the question before the court is whether they are entitled to enhanced damages because the infringement was willful. Whether infringement is willful is a question of fact. i4i Ltd. P'ship v. Microsoft Corp., 598 F.3d 831, 859 (Fed. Cir. 2010), aff'd, 131 S. Ct. 2238 (2011). Where willful infringement is found, the court may award up to treble damages. 35 U.S.C. § 284; In re Seagate Tech., LLC, 497 F.3d 1360, 1368 (Fed. Cir. 2007) (en banc) (“an award of enhanced damages requires a showing of willful infringement”). Because the Infinera sale did not occur until after the verdict, the jury did not have an opportunity to consider whether it was willful.

Before turning to the question of willful infringement, however, the court will briefly address defendant's attempt to reargue a point it has already lost: whether the Infinera sale harmed plaintiffs at all. First, defendant suggests no damages were awarded for the Infinera sale. Defendant is mistaken. The Report & Recommendation clearly reflects plaintiffs were harmed by all four infringing sales; however, the court recommended an award of 60% of the total amount to reflect plaintiffs' market share as proven at trial. See Report & Recommendation at 8-9. Plaintiffs were awarded damages for the Infinera sale in proportion to their market share.

Second, defendant suggests plaintiffs were not harmed by the Infinera sale because it was an outlier – a used, six-year-old, demonstration machine sold at a loss. To obtain an award of lost profits, a patent owner “must show a reasonable probability that, absent the infringement, it would have made the infringer's sales.” See BIC Leisure Prods., Inc. v. Windsurfing Int'l, Inc., 1 F.3d 1214, 1218 (Fed. Cir. 1993). Defendant argues plaintiffs could not have supplied a

comparable machine at a comparable price, and therefore, no lost profits are appropriate. Again, plaintiffs' actual damages with respect to the Infinera sale were resolved in the Report & Recommendation, and the court will not revisit them.²

Returning to the question of willful infringement, the court notes that "[o]ne who has actual notice of another's patent rights has an affirmative duty to respect those rights." Read Corp. v. Portec, Inc., 970 F.2d 816, 828 (Fed. Cir. 1992), superseded in part on other grounds by Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed. Cir. 1995), aff'd, 517 U.S. 370 (1996). Accordingly, a verdict of infringement ordinarily means that future infringement is willful. Cummins-Allison Corp. v. SBM Co., 669 F. Supp. 2d 774, 775 (E.D. Tex. 2009). A verdict of infringement also imposes on the infringer a duty to inform the patent holder of shipments of infringing product, and, "at a minimum, to propound a position (whether by an opinion of counsel or otherwise)" as to why post-verdict shipments are non-infringing. TruePosition Inc. v. Andrew Corp., 611 F. Supp. 2d 400, 411 (D. Del. 2009).

"[P]roof of willful infringement permitting enhanced damages requires at least a showing of objective recklessness." Seagate, 497 F.3d at 1371. A patentee "must show by clear and convincing evidence that the infringer acted despite an objectively high likelihood that its actions constituted infringement of a valid patent," and that risk must be "either known or so obvious

² If the court were inclined to revisit the question, it would reach the same conclusion as before. Defendant's assertion that plaintiffs could not have made the sale is belied by defendant's own evidence, which tends to show defendant's contemporaneous awareness that plaintiffs had a similar demonstration machine to offer Infinera, and were competing with defendant on price and features. Lee Damages Decl. Ex. E. Defendant's evidence also tends to show that money lost on the initial sale may be made up by sales of follow-up products and services. See id. The evidence supports an inference that, but for defendant offering an infringing machine at a "rock-bottom" price, plaintiffs would have made the sale.

that it should have been known to the accused infringer.” Id. The infringer’s subjective state of mind “is not relevant,” and the infringer has no affirmative duty to obtain an opinion of counsel to avoid a finding of willful infringement. Id. However, acting in reasonable, good faith reliance upon the advice of counsel remains a defense to willful infringement. See id. at 1375.

An adjudicated infringer may avoid a finding of willfulness by obtaining a post-verdict opinion of counsel that the product does not infringe. See Lexion Medical, LLC v. Northgate Tech., Inc., 292 Fed. Appx. 42, 51 (Fed. Cir. 2008) (unpublished). For example, in Lexion, after the jury verdict, the infringer obtained such an opinion. The Federal Circuit held, “We do not think it was objectively reckless for [the infringer] to obtain and rely on the opinion of counsel, which had predicted a favorable outcome in view of the renewed motion for JMOL then pending before the district court.” Id. However, if a jury finds willful infringement, an infringer may not continue to rely in good faith on counsel’s pre-trial opinion of non-infringement. See Stryker Corp. v. Davol, Inc., 75 F. Supp. 2d 746, 748 (W.D. Mich. 1999).

Here, the court finds plaintiffs have proved by clear and convincing evidence that the Infinera sale was willful infringement. On March 5, 2009, the jury put defendant on notice that future Falcon sales were infringing. Defendant responded by calling the verdict “preliminary” and urging its sales force to emphasize to customers that “this process is not over and no judgment has been made.” On April 10, 2009, more than a month later, defendant initiated communications with Infinera. The sale did not close until May 22, 2009, more than two months after the verdict. Defendant’s internal communications during this period reflect defendant knew it was competing directly with plaintiffs for the sale, and was willing to lose money on the sale simply to “hurt Rudolph with a rock bottom price.” The undisputed evidence reflects defendant

intended to sell a product which it knew a jury had found infringed a valid patent.

Defendant argues it had a good faith belief that the jury's verdict was not the final word. First, defendant argues, the trial was not over yet, because the court had not addressed its defense of inequitable conduct, which had been severed in contemplation of a bench trial. Second, defendant notes it immediately challenged the jury's verdict through post-trial motions, which were pending at the time of the Infinera sale.

These arguments do not support a good faith belief of non-infringement. To have shown inequitable conduct, defendant would have had to prove by clear and convincing evidence that plaintiffs' NSX-80 device was on sale before July 15, 1997. The jury explicitly found to the contrary [Docket No. 466]. Defendant was on notice well before the Infinera sale that its inequitable conduct defense was without factual basis, and so cannot credibly assert that additional issues remained to be tried. Moreover, defendant's bare decision to challenge the verdict, standing alone, does not clothe it in a good faith belief that future sales will not infringe. The fact that the jury found validity and infringement despite defendant's evidence and argument to the contrary, combined with the deferential standard of review applied to a jury verdict, establish an objectively high likelihood that post-verdict sales will infringe. See Cummins-Allison, 669 F. Supp. 2d at 781.

Nor has defendant shown it made the Infinera sale in good faith reliance on the advice of counsel. Defendant compares this case to Lexion, in which the Federal Circuit held it was not objectively reckless for an adjudicated infringer to rely on counsel's post-verdict opinion of non-infringement prior to liquidating its inventory. Lexion, 292 Fed. Appx. at 51. The facts here are far different. Defendant offers no evidence that it obtained a post-verdict opinion of counsel

prior to the Infinera sale. Indeed, defense counsel's subsequent misrepresentations about the timing of the sale, if inadvertent, strongly suggest counsel was not consulted in advance.

An adjudicated infringer seeking to avoid a finding of willfulness by showing it relied on the advice of counsel must do more than assert its "non-infringement and invalidity positions are well-founded and currently on appeal." Def's Opp. [Docket No. 724] at 3. Defendant's press releases and litigation positions show, at most, defendant's subjective state of mind, which is "not relevant to this objective inquiry." Seagate, 497 F.3d 1371. The Federal Circuit has recognized the "fundamental difference" between legal advice provided by trial counsel, which "focuses on litigation strategy," and by opinion counsel, which "serves to provide an objective assessment for making informed business decisions." Id. at 1373. Accordingly, for the purpose of establishing good faith reliance on the advice of counsel, mere litigation positions are not equivalent to a competent, timely legal opinion of non-infringement. Id. The court finds plaintiffs have shown by clear and convincing evidence that the Infinera sale was willful infringement.

Although a finding of willful infringement is a necessary prerequisite to an award of enhanced damages, the inquiry does not end there. See i4i Limited P'ship, 598 F.3d at 859. Once willful infringement is found, the decision whether to award enhanced damages, and what those damages should be, are matters for the court's discretion. Id. "A finding of willful infringement does not mandate that damages be enhanced, much less mandate treble damages." Read, 970 F.2d at 826 (Fed. Cir. 1992). "The paramount determination" in awarding enhanced damages "is the egregiousness of the defendant's conduct based on all the facts and circumstances." Id. To guide the court's discretion in such matters the Federal Circuit has

articulated a series of non-exclusive factors for consideration: (1) “whether the infringer deliberately copied the ideas or design of another;” (2) “whether the infringer, when he knew of the other’s patent protection, investigated the scope of the patent and formed a good-faith belief that it was invalid or that it was not infringed;” (3) “the infringer’s behavior as a party to the litigation;” (4) the infringer’s “size and financial condition;” (5) the “closeness of the case;” (6) the “duration of the [infringer’s] misconduct;” (7) any “remedial action” by the infringer;” (8) the infringer’s “motivation for harm;” and (9) whether the infringer “attempted to conceal its misconduct.” Id. at 827.

Consideration of these factors, as well as others relevant to post-verdict infringement, leads the court to conclude as a matter of discretion that, although the infringement was willful, an award of enhanced damages is not appropriate.

Factors (1) and (6) mitigate against an award of enhanced damages. There is no evidence of deliberate copying and the jury did not find willful infringement at trial. The duration of the misconduct was brief: a single sale completed within three months of the verdict. The misconduct here is less egregious than that presented in the cases cited by plaintiffs. See TruePosition, 611 F. Supp. 2d at 404 (infringer continued to ship hundreds of infringing units eight months after verdict); Stryker, 75 F. Supp. 2d at 748 (infringer continued to ship infringing units for nearly a year). Also in contrast to those cases, the infringing machine was manufactured years before the verdict, and defendant lost money on the infringing sale.

Factor (2) favors enhancement: defendant has not established a basis for a good faith belief that its products did not infringe. Calling a jury verdict “preliminary” does not make it so. When the issue of infringement is contested and lost at trial, defendant is on notice that future

infringement is likely to be willful. Continuing to contest the issue after trial preserves the possibility of a future favorable decision, but does not, without more, establish a present good faith belief of non-infringement. Defendant did not obtain a post-verdict opinion of counsel. Nor is defendant's cause helped by gratuitous post-verdict statements about "hurt[ing]" plaintiffs, made by an employee who was personally aware of the verdict yet made a deliberate decision to disregard it. Cf. TruePosition, 611 F. Supp. 2d at 405-06. Defendant had no basis for a good-faith belief of non-infringement.

The remaining factors (3), (4), (5), (7), (8) and (9) are balanced or neutral. Defendant's behavior in this litigation has been within the bounds of zealous representation. Defendant's size and financial condition suggest it would be able to pay an award of enhanced damages, but do not compel such an award. Defendant contested both validity and infringement at trial and continues to do so on appeal. The Infinera machine was manufactured well before the verdict, and its sale is more analogous to a liquidation of inventory than a deliberate attempt to continue manufacturing and selling infringing products without any attempt to redesign them. Motivation for harm is neutral; the sale could certainly be viewed as an attempt to "hurt" plaintiffs, but also could be characterized as a favor for a customer which harmed defendant as well as plaintiff.

Finally, there is the issue of concealment. Defendant breached its obligation to timely and truthfully inform plaintiffs of the Infinera sale, and compounded plaintiffs' suspicions by opposing discovery. However, the court accepts defendant's representation that its failure to timely and accurately inform plaintiffs of the Infinera sale may be attributed to mistakes and inadvertence, rather than a deliberate intent to conceal. The court finds this factor is neutral.

Plaintiffs have already been compensated for their actual loss arising from the Infinera

sale. Viewing the totality of the circumstances, the court finds plaintiffs are not entitled to enhanced damages for the Infinera sale, nor are they entitled to costs and fees.

III. Conclusion

For the foregoing reasons, plaintiffs' motion for enhanced damages [Docket No. 709] is denied.

IT IS SO ORDERED.

Dated: August 11, 2011

____s/ Arthur J. Boylan_____
The Hon. Arthur J. Boylan
United States Chief Magistrate Judge

**UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

AUGUST TECHNOLOGY CORPORATION
and RUDOLPH TECHNOLOGIES, INC.

Plaintiffs,

v.

MEMORANDUM OF LAW & ORDER
Civil File No. 05-1396 (MJD/FLN)

CAMTEK, LTD.,

Defendant.

Daniel W. McDonald, Joseph E. Lee, and Rachel C. Hughey, Merchant & Gould P.C., and Ernest W. Grumbles, Adams Monahan LLP, Counsel for Plaintiffs.

Jonathan S. Caplan, Christopher A. Colvin, and Jean-Paul Ciardullo, Kramer Levin Naftalis & Frankel LLP, and William A. LeMire, Arthur, Chapman, Kettering, Smetak & Pikala, P.A., Counsel for Defendant Camtek, Ltd.

I. Introduction

The above-entitled matter comes before the Court upon a Report and Recommendation and an Order of United States Magistrate Judge Arthur J. Boylan, both dated August 11, 2011. [Docket Nos. 731 & 732.] In his Report and Recommendation the Magistrate Judge recommended that Plaintiffs' Motion for Contempt [Docket No. 715] be granted, that the Defendant be ordered to pay

Plaintiffs \$1,291,892, reflecting double damages, as a sanction, and that Plaintiffs be awarded attorney fees and costs in an amount determined by the Court. In a separate Order, the Magistrate Judge denied Plaintiffs' Motion for Enhanced Damages. Defendant Camtek, Ltd. has filed objections to the Magistrate Judge's recommendation on the contempt motion and has also sought to strike a finding in the Order denying enhanced damages.

II. Objections to Report and Recommendation on Finding of Contempt

Pursuant to statute, the Court has conducted a de novo review upon the record. 28 U.S.C. § 636(b)(1); Local Rule 72.2(b). Based upon that thorough review, the Court will adopt the Report and Recommendation, adding the following observations to the Magistrate Judge's already thorough and accurate Report:

Plaintiffs brought this action in 2005, alleging that Defendant's Falcon machine infringed U.S. Patent No. 6,826,298 ("the '6,298 patent") held by Plaintiffs in connection with their NSX-80 machine. The details of the claims are not relevant to the instant motion. On March 5, 2009, after a trial conducted by this Court, a jury found that Defendant's Falcon device infringed on two claims in the '6,298 patent. After extensive briefing and argument by the parties, the

Court issued a permanent injunction on August 28, 2009, which enjoined

Defendant from

communicating with third parties (in person, via phone, via email, or by any other means) located in the United States for the purposes of offering to sell Falcon machines or machines that are colorable imitations thereof, notwithstanding where the third party intends to use the machines[.]

(Order on Final Judgment and Injunctive Relief [Docket No. 547].)

Caught violating this provision, Defendant now feigns ignorance as to the meaning of the clause beginning with the word “notwithstanding” (the “notwithstanding clause”). Any such ignorance is newfound. In a June 19, 2009 memorandum, Defendant helpfully explained the meaning and impact of the notwithstanding clause, stating that “in other words” it “would prevent [Defendant] from offering to sell a Falcon machine to parties in the U.S. even if the sale is consummated abroad and the Falcon machine is used abroad.” (Def.’s Mem. in Opp’n [Docket No. 528] at 20.) The Court agrees that Defendant’s “other words” adequately and accurately convey the meaning of the notwithstanding clause.

Fully aware of the meaning of the notwithstanding clause, Defendant sought to have it deleted in a motion before this Court to “clarify” the injunction.

(Mem. in Supp. of Camtek's Rule 60 Motion for Clarification [Docket No. 601] at 2). That motion was denied. The Court declined to remove the clause which, in Defendant's words, "prevent[ed it] from offering to sell a Falcon machine to parties in the U.S. even if the sale is consummated abroad and the Falcon machine is used abroad." (Def.'s Mem. in Opp'n at 20.)

In spite of this Court's clear instruction not to "communicat[e] with third parties . . . located in the United States for the purposes of offering to sell Falcon machines" Defendant did just that, twice, in late 2009. The Magistrate Judge's Report and Recommendation sets out the details of Defendant's violations; this Court need not rehash Defendant's misdeeds. Suffice it to say that there is no doubt that Defendant engaged in behavior specifically prohibited by the notwithstanding clause—a clause which Defendant clearly understood and which the Court had specifically declined to change—while the injunction was in full force.

The Defendant knowingly and in bad faith violated the Court's clear and unambiguous injunction. Defendant's arguments to avoid this reality are not worth repeating. At bottom, they boil down to one badly flawed unstated proposition: Defendant was not obligated to obey the Court's injunction because

Defendant believed its scope somehow exceeded the Court's authority. "[A]n order issued by a court with jurisdiction . . . must be obeyed by the parties until it is reversed by orderly and proper proceedings." United States v. United Mine Workers of Am., 330 U.S. 258, 293 (1947) (noting that "[t]his is true without regard even for the constitutionality of the Act under which the order is issued"). Unless and until the injunction is stayed or vacated by this Court or a higher court, the enjoined party is bound to follow its instructions, and violations will be subject to a contempt finding. This Court finds Defendant in contempt.

What remains is Defendant's objection to the Magistrate Judge's calculation of damages and his recommendation to double them. In their Memorandum in Support of Motion for Contempt [Docket No. 717], Plaintiffs presented evidence and arguments supporting their asserted loss as a result of Defendant's contemptuous activity, and they requested treble damages. Defendant did not respond to Plaintiffs' damages calculations or arguments in its opposition brief. [Docket No. 726.] The Magistrate Judge did his own calculations of Defendant's lost profits based on his already exhaustive analysis of that issue. [Docket No. 683.] That issue had been fully briefed, and the Magistrate Judge's analysis was adopted by this Court on January 7, 2011.

[Docket No. 707.] After arriving at a total loss figure, the Magistrate Judge recommended that the damages be doubled in light of the flagrant nature of Defendant's behavior.

Defendant now argues that it did not have an opportunity to argue this issue before the Magistrate Judge, but it is unclear what it could have argued in the absence of any mention of the issue in its briefing. The Court considers Defendant's new arguments waived. See Marshall v. Chater, 75 F.3d. 1421, 1426 (10th Cir. 1996) ("issues raised for the first time in objections to the magistrate judge's recommendation are deemed waived"); Castillo-Alvarez v. Hawkinson, Civ. No. 10-4187, 2011 WL 3798585, at *1 n.1 (D. Minn. Aug. 25, 2011). In any event, the Court finds those arguments unpersuasive. This Court has already concluded that lost profits per machine amounted to \$322,973. [Docket Nos. 681 & 707.] There was no need to litigate that issue once more.

As for the doubling of damages, the Court notes that sanctions in contempt proceedings may "be employed for either or both of two purposes; to coerce the defendant into compliance with the court's order, and to compensate the complainant for losses sustained." United Mine Workers, 330 U.S. at 303-04. Here the sanction serves both purposes. Plaintiffs are properly compensated for

their losses, and the double damages penalty serves as a stern warning to a party which has shown a clear lack of respect not only for this Court's instructions, but also for a jury's verdict. The Court only hopes that this award is sufficient to discourage Defendant from further unlawful behavior in the future.

In light of the foregoing observations, the Court's de novo review of the record, and all of the thoughtful reasons given by the Magistrate Judge, the Court **ADOPTS** the Report and Recommendation of United States Magistrate Judge Boylan dated August 11, 2011 [Docket No. 731].

III. Motion to Set Aside Finding of Willful Infringement

Defendant has requested that this Court set aside a finding of willful infringement contained in the Magistrate Judge's August 11, 2011 Order which, ruling in Defendant's favor, denied Plaintiffs' request for enhanced damages arising out of post-verdict infringement by Defendant.

Defendant has not shown how it is prejudiced by the Magistrate Judge's favorable order. The rule that prevailing parties lack standing to appeal decisions in their favor is well established. Enterprise Bank v. Saettele, 21 F.3d 233, 236 n.3 (8th Cir. 1994) (citing Public Serv. Comm'n v. Brashear Freight Lines,

306 U.S. 204, 206 (1939)). The Court declines the invitation to meddle with a factual finding contained within an order favorable to Defendant.

Accordingly, based upon the files, records, and proceedings herein, **IT IS**

HEREBY ORDERED:

1. The Court **ADOPTS** Magistrate Judge Arthur J. Boylan's Report and Recommendation dated August 11, 2011 [Docket No. 731];
2. Plaintiffs' Motion for Contempt [Docket No. 715] is **GRANTED**;
3. Defendant is ordered to pay Plaintiffs \$1,291,892 as a sanction for contempt;
4. Plaintiffs are awarded reasonable attorney fees and costs incurred in bringing their Motion for Contempt;
5. this matter is referred to Magistrate Judge Franklin L. Noel for determination of reasonable attorney fees; and
6. Defendant's Motion to Set Aside the Magistrate Judge's Finding of Willful Infringement [Docket No. 750] is **DENIED**.

Dated: March 26, 2012

s/ Michael J. Davis

Michael J. Davis

Chief Judge

United States District Court

UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

August Technology Corporation,

Civil No. 05-1396 JRT/FLN

Plaintiff,

v.

SCHEDULING ORDER

Camtek, Ltd.,

Defendant.

Pursuant to Rule 16 of the Federal Rules of Civil Procedure and the Local Rules of this Court, and in order to secure the just, speedy, and inexpensive determination of this action, the following schedule shall govern this proceeding. The schedule may be modified only upon formal motion and a showing of good cause as required by Local Rule 16.3.

1. Discovery/Non-Dispositive Motions:

- a. No discovery is necessary.
- b. All nondispositive motions and supporting documents, including those which relate to discovery, shall be served by May 1, 2012. Nondispositive motions may be scheduled for hearing by calling Cathy Orlando, Calendar Clerk to Magistrate Judge Franklin L. Noel, 612-664-5110. All nondispositive motions shall be scheduled, filed and served in compliance with Local Rules 7.1, 37.1 and 37.2.

2. Expert Disclosure and Discovery:

- a. Disclosure of the identity of expert witnesses under Rule 26(a)(2)(A) shall be made as follows:
 - 1) By all parties on or before May 15, 2012, with respect to initial experts.
 - 2) By all parties on or before June 1, 2012,

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with respect to rebuttal experts.

- b. Full disclosure of the substance of the testimony to be offered by each expert witness shall be made as follows:
 - 1) By all parties on or before May 15, 2012, with respect to initial expert reports..
 - 2) By all parties on or before June 1, 2012, with respect to rebuttal expert reports.
- c. Each party may depose expert witnesses on or before June 10, 2012.
- d. Any expert testimony which has not been fully disclosed in accordance with this schedule shall be excluded from evidence at trial.

3. Dispositive Motions:

- a. All dispositive motions shall be served and filed on or before July 1, 2012.
- b. Counsel are advised that they must schedule this hearing by calling Judge Tunheim's Calendar Clerk, Holly McLelland, at 612-664-5083.
- c. All dispositive motions shall be scheduled, filed and served in compliance with the Electronic Case Filing Procedures for the District of Minnesota and in compliance with Local Rule 7.1.

4. Trial

- a. This case shall be ready for trial no later than October 1, 2012, at which time it will be placed on the court's non-jury trial calendar.

DATED: April 25, 2012.

s/ Franklin L. Noel
FRANKLIN L. NOEL
United States Magistrate Judge

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UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

August Technology Corporation and
Rudolph Technologies, Inc.,

Civil No. 05-1396 (JRT/FLN)

Plaintiffs,

v.

ORDER

Camtek, Ltd.,

Defendant.

William D. Schultz and Joseph E. Lee for Plaintiffs.
Wayne O. Stacy and William F. Mohrman for Defendant.

THIS MATTER came before the undersigned United States Magistrate Judge on June 18, 2012 on Camtek's Motion to Enforce the Court's Scheduling Order and to Bifurcate and Set Schedule for Proceedings Addressing Remedies (ECF No. 798).

This motion arises out of a dispute between the parties as to whether the new trial in this case should address damages in addition to infringement. In 2009, after the original trial in this case, a jury returned a verdict finding Camtek had infringed Plaintiffs' patent and awarding lost profits damages. The Court then entered judgment based on the jury verdict and entered a permanent injunction. Camtek appealed the Court's final judgment, including the finding of infringement, the award of lost profits damages, and the injunction.

The Court of Appeals for the Federal Circuit found that the District Court erred in its claim construction of the term "wafer" and vacated the verdict of infringement. *August Technology Corporation v. Camtek*, 655 F.3d 1278, 1286 (Fed. Cir. 2011). The Court remanded

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for “a limited trial on infringement with respect to this claim element.” *Id.* The Court also vacated the award of damages and the grant of a permanent injunction. *Id.* at 1281. The Federal Circuit stated with regard to remedies, “Because we vacate and remand for further proceedings under the correct claim construction, we do not reach the parties’ contentions regarding damages and the injunction.” *Id.* at 1290. The Court went on to advise the trial court that in the event it found Camtek’s Falcon inspection machine to infringe under the new claim construction, it should to take into account the effect, if any, of *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296 (Fed. Cir. 2010) when crafting an appropriate injunction. *Id.* at 1291.

At the scheduling conference to set a schedule for the new trial on remand, the parties disputed whether the Federal Circuit’s opinion required a retrial of damages. Plaintiffs took the position that the Federal Circuit remanded for the limited purpose of a trial on infringement and for the court to consider the injunction issue post-trial. Defendants took the position that damages must be retried, along with infringement. The Court determined that a retrial on damages was not required, stating in the minutes from the scheduling conference that a “new trial on infringement is required.” (ECF No. 788.)

Following the scheduling conference, Plaintiffs served an expert report, the Second Supplemental Report by Frances M. McCloskey, which addresses the injunction issue and references Ms. McCloskey’s prior report on damages. Defendant asserts that because the trial is limited to the issue of infringement, service of Ms. McCloskey’s report violates the scheduling order. Defendant asks the Court to order Plaintiffs to withdraw Ms. McCloskey’s expert report. Defendant also argues that service of Ms. McCloskey’s report is a concession by Plaintiffs that

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damages are at issue on remand, and asks the Court to bifurcate the issue of remedies and to set a new schedule for a proceeding on damages and the injunction to follow the trial on infringement.

The Federal Circuit expressly did not consider the issue of damages that was raised before it by Defendant. This Court is confident that damages were properly determined by the trial court and the jury in the first trial of this case. If infringement is found on retrial, the damages for infringement will be the same under the new claim construction as the damages under the prior claim construction. There is no need for a new trial on damages. In the event infringement is found, the original damage award will be reinstated. To the extent Defendant is seeking an order bifurcating the issue of remedies and setting a new schedule for a proceeding on damages following the trial on infringement, the motion is denied.

The Federal Circuit expressly directed the District Court to consider the *Transocean* case when crafting an appropriate injunction. In the event Camtek's Falcon machine is found to infringe after a new trial, the District Court will then craft an appropriate injunction. Because the scope of an appropriate injunction is at issue on remand, experts reports on the injunction issue are appropriate. Defendant's request that Plaintiffs be required to withdraw the Second Supplemental Report of Frances McCloskey is denied. At the hearing, Plaintiffs disavowed any statement in the report related to damages, and asserted that the report only applies to the injunction issue. To the extent Defendant is seeking permission to file a rebuttal report on the injunction issue, the Court grants permission to file such a report.

Based upon the foregoing and all the files, records and proceedings herein, **IT IS HEREBY ORDERED** that Camtek's Motion to Enforce the Court's Scheduling Order and to Bifurcate and Set Schedule for Proceedings Addressing Remedies (ECF No. 798) is **DENIED** as follows:

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1. To the extent the motion seeks an order bifurcating the issue of remedies into a separate proceeding, the motion is **DENIED**.
2. To the extent the motion seeks an order requiring Plaintiffs to withdraw the May 15, 2012 Second Supplemental Report of Frances McCloskey, the motion is **DENIED**.
3. Defendant may file its own expert report on the injunction issue. For purposes of such a report, the deadline for rebuttal expert reports is extended from June 1, 2012 to July 9, 2012.

DATED: June 25, 2012

s/ Franklin L. Noel
FRANKLIN L. NOEL
United States Magistrate Judge

UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

AUGUST TECHNOLOGY
CORPORATION and RUDOLPH
TECHNOLOGIES, INC.,

Civil No. 05-1396 (JRT/FLN)

Plaintiffs,

MEMORANDUM OPINION
AND ORDER

v.

CAMTEK, LTD.,

Defendant.

Ernest W. Grumbles, III, **ADAMS MONAHAN, LLP**, 60 South Sixth Street, Suite 2540, Minneapolis, MN 55402; Regina Vogel Culbert, **MERCHANT & GOULD PC**, 701 Fifth Avenue, Suite 4700, Seattle, WA 98104; and Thomas R. Johnson, William D. Schultz, Daniel W. McDonald, Heather J. Kliebenstein, Joseph E. Lee, and Rachel C. Hughey, **MERCHANT & GOULD PC**, 80 South Eighth Street, Suite 3200, Minneapolis, MN 55402 for plaintiff August Technology Corporation.

Daniel W. McDonald, **MERCHANT & GOULD PC**, 80 South Eighth Street, Suite 3200, Minneapolis, MN 55402, for plaintiff Rudolph Technologies, Inc.

Ann N. Cathcart Chaplin and Michael E. Florey, **FISH & RICHARDSON PC**, 60 South Sixth Street, Suite 3200, Minneapolis, MN 55402; David R. Francescani, Edmond R. Bannon and Michael F. Autuoro, **FISH & RICHARDSON PC**, 153 East 53rd Street, 52nd Floor, New York, NY 10022; Mark T. Smith, **COOLEY LLP**, 3175 Hanover Street, Palo Alto, CA 93404; Thomas J. Friel, Jr., **COOLEY LLP**, 101 California Street, 5th Floor, San Francisco, CA 94111; Sarah J. Guske and Wayne O. Stacy, **COOLEY LLP**, 380 Interlocken Crescent, Suite 900, Broomfield, CO 80021; and Vincent J. Fahnlander and William F. Mohrman, **MOHRMAN & KAARDAL**, 33 South Sixth Street, Suite 4100, Minneapolis, MN 55402, for defendant.

Plaintiffs August Technology Corporation and Rudolph Technologies, Inc. brought this action in 2005 against defendant Camtek, Ltd. (“Camtek”) alleging patent infringement, and the case has been extensively litigated. In 2009, a jury found the plaintiffs’ patent was valid and infringed by Camtek’s machines, and the Court entered judgment and a permanent injunction. In 2011, the Federal Circuit vacated the judgment of infringement and the permanent injunction and remanded for further proceedings. The matter is now before the Court on Camtek’s motions for relief under Federal Rules of Civil Procedure 59 and 60 and Camtek’s objections to the Magistrate Judge’s award of Fees and Costs. The Court will grant in part and deny in part Camtek’s motion for relief from the Court’s contempt order and sanctions award because it finds that although Camtek was in contempt, the sanctions imposed should only be compensatory. The Court will deny Camtek’s motions for relief from the Court’s judgment of willful infringement because Camtek lacks standing to appeal the order. The Court will overrule Camtek’s objections to the Magistrate Judge’s order as moot.

BACKGROUND¹

Both parties manufacture machines that automatically inspect integrated circuits on semiconductor wafers. In March 2009, a jury returned a verdict finding that Camtek’s Falcon device literally infringed plaintiffs’ U.S. Patent No. 6,826,298. (Docket No. 466.) In August 2009, this Court entered an Order on Final Judgment and Injunctive Relief. (Docket No. 547.) The injunction prohibited Camtek from “communicating with third

¹ A more complete recitation of the facts may be found in the Court’s prior orders.

parties (in person, via phone, via e-mail, or by any other means) located in the United States for the purposes of offering to sell Falcon machines or machines that are colorable imitations thereof, notwithstanding where the third party intends to use the machines.” (*Id.*)

In March 2011, Plaintiffs brought a motion for contempt (Docket No. 715), alleging that Camtek had violated this prohibition. In May 2011, the Magistrate Judge heard argument on the contempt motion, but the parties did not address the issue of damages.² In August 2011, the Magistrate Judge recommended that the motion be granted. (Report & Recommendation, Docket No. 731 [hereinafter “2011 R&R”].) The 2011 R&R found that the facts were “undisputed” and that Camtek had communicated with a third party in the United States for the purposes of selling a Falcon machine for delivery in Asia. (*Id.* at 1, 5, 9.) Because Plaintiffs presented evidence that Camtek’s prohibited communication led to two Falcon sales, the Court – based on figures previously determined – found that Plaintiffs had lost \$322,973 in profits for each machine. (*Id.* at 9-10.) The 2011 R&R recommended an award of double damages and attorneys’ fees and costs. (*Id.* at 10.)

In March 2011, Plaintiffs also brought a motion for enhanced damages. (Docket No. 709.) In August 2011, the Magistrate Judge found that the “plaintiffs have proved by

² Camtek claims that the parties had agreed to table the issue of contempt-related remedies until after the contempt motion had been decided, and indicated this intent in a letter to the Magistrate Judge. (*See* Letter, April 20, 2011, Docket No. 723.) The letter does indicate that the parties plan to “defer the hearing” on the remedies (*id.*), but Camtek did not address damages in its response brief after Plaintiffs’ moved for sanctions (Def.’s Mem. in Opp’n to Pl.’s Mot. for Contempt, May 20, 2011, Docket No. 726; *see also* Order at 6, Mar. 26, 2012 Docket No. 764 (noting the absence of the issue in the briefing)).

clear and convincing evidence . . . willful infringement.” (Order at 6, Docket No. 732 [hereinafter “2011 Order”].) Because the misconduct was found to be brief and the infringing product was made before the verdict, Plaintiffs’ motion for enhanced damages was nevertheless denied. (*Id.* at 9, 11.)

A few days after the 2011 R&R and 2011 Order, the Federal Circuit held that the “district court erred in its claim construction,” and it vacated this Court’s judgment of infringement and its grant of a permanent injunction and remanded for further proceedings. *August Tech. Corp. v. Camtek Ltd.*, 655 F.3d 1278, 1281 (Fed. Cir. 2011). In March 2012, the Court issued an order adopting the 2011 R&R – including the award of double damages and attorneys’ fees and costs – and denying Camtek’s motion to set aside the finding of willful infringement. (Order, Mar. 26, 2012, Docket No. 764 [hereinafter “March 2012 Order”].)

On April 4, 2012, this case was reassigned to the undersigned. In April 2012, Plaintiffs moved for an order granting its request for attorneys’ fees and costs. On May 1, 2012, the Magistrate Judge granted that motion. (Docket No. 795 [hereinafter “May 2012 Order”].) Camtek objects to the May 2012 Order granting Plaintiffs attorneys’ fees and costs, arguing that the fees and costs should not have been awarded “while the underlying finding of contempt remains unsettled.” (Docket No. 797.)

Camtek also brings a Rule 60 Motion, seeking relief from the Contempt Order and Sanctions award, and a Rule 59 and Rule 60 Motion, seeking relief from willful infringement finding in the 2011 Order.

DISCUSSION

I. RULE 60 MOTIONS

A. Standard of Review

Under Rule 60(b) a party can seek relief from judgment if:

(4) the judgment is void;

(5) the judgment has been satisfied, released or discharged; it is based on an earlier judgment that has been reversed or vacated; or applying it prospectively is no longer equitable; or

(6) any other reason that justifies relief

Fed. R. Civ. P. 60(b). “The rule ‘provides for extraordinary relief which may be granted only upon an adequate showing of exceptional circumstances.’” *Jones v. Swanson*, 512 F.3d 1045, 1048 (8th Cir. 2008) (quoting *United States v. Young*, 806 F.2d 805, 806 (8th Cir. 1986)). Camtek seeks relief under Rule 60(b)(4), (b)(5), and (b)(6).

B. Motion with Respect to Contempt and Sanctions

Camtek seeks relief under Rule 60(b) for both the contempt holding and the Court’s imposition of sanctions. First, Camtek argues that the contempt holding was improper because the injunction was unclear. The Court has addressed and rejected this argument repeatedly (*see, e.g.*, 2011 R&R at 7-8), and Camtek offers no new argument. The Court will, therefore, affirm the contempt holding.

Camtek contends that the sanctions awarded by the Court for violation of the injunction are criminal sanctions and that it was deprived of due process. Rule 60(b)(4) provides that a court may relieve a party from a judgment if it is void. “A judgment is

void if the rendering court . . . acted in a manner inconsistent with due process.” *Baldwin v. Credit Based Asset Servicing & Securitization*, 516 F.3d 734, 737 (8th Cir. 2008) (citation omitted). Civil contempt sanctions may be imposed “in an ordinary civil proceeding upon notice and an opportunity to be heard.” *Int’l Union, United Mine Workers of Am. v. Bagwell*, 512 U.S. 821, 827 (1994). Criminal sanctions, however, require the protections that the Constitution requires of criminal proceedings. *Id.* at 826. A contempt sanction is considered “civil if it is remedial, and for the benefit of the complainant.” *Id.* at 827 (internal quotation marks and citation omitted). A sanction is considered criminal if it is punitive, “to vindicate the authority of the court.” *Id.* at 828. “Where a fine is not compensatory, it is civil only if the contemnor is afforded an opportunity to purge.” *Id.* at 829.

In its March 2012 Order adopting the 2011 R&R, the Court imposed double damages. (March 2012 Order at 6.) The Court stated that the damages were to compensate Plaintiffs for their losses, to serve “as a stern warning to a party which has shown a clear lack of respect” for the Court, and to discourage Camtek from “further unlawful behavior in the future.” (*Id.* at 6-7.) Although “[m]ost contempt sanctions . . . to some extent punish a prior offense as well as coerce an offender’s future obedience,” *Bagwell*, 512 U.S. at 828, the Court finds that to the extent the doubling of the damages was intended to enforce the Court’s authority, rather than to compensate the Plaintiffs, the sanction was criminal, and it appears that Camtek did not receive adequate due process. Consequently, the Court will relieve Camtek from half of the sanctions award – that is, Defendant will be ordered to pay Plaintiffs \$645,946 – not \$1,291,892.

Camtek argues that even if the sanctions were civil contempt sanctions, it was not given adequate notice and opportunity to be heard because it received no separate hearing on the damages issue. *See Bagwell*, 512 U.S. at 827. Camtek was given the opportunity to be heard on the issue of contempt, but it did not respond to the issues of damages in its briefing and asked the Court not to consider damages at the scheduled hearing. Camtek cites no authority to support its contention that a separate hearing is required for contempt sanctions.³ The Court finds that Camtek was given adequate notice of the reasons why contempt was being considered and the opportunity to prepare a defense and be heard. *See Mackler Productions, Inc. v. Cohen*, 225 F.3d 136, 144 (2d Cir. 2000). A separate hearing on the damages issue was not required.

Finally, Camtek argues that the damages were incorrectly calculated. In effect, Camtek argues that Plaintiffs could not have lost profits because “lost profit damages are meant to restore the profits lost by the patentee as the result of infringement” (Def.’s Mem. in Supp. at 16, Apr. 18, 2012, Docket No. 782), and the Federal Circuit vacated the finding of infringement. Here, however, Plaintiffs lost profits because of Camtek’s violation of the injunction. When compensation to the other party is the intent of a contempt sanction, “a fine is imposed, payable to the complainant,” and the fine is “based upon evidence of complainant’s actual loss.” *United States v. United Mine Workers of*

³ Camtek cites *Schleper v. Ford Motor Co., Auto. Div.*, 585 F.2d 1367, 1372 (8th Cir. 1978) to support its argument that it was deprived of the required notice and hearing for contempt sanctions. But in *Schleper*, the notice of the hearing pertained to a motion for dismissal – not a motion for contempt – and counsel limited his remarks at the hearing to the dismissal issue. Accordingly, the court found the notice of **contempt** to be inadequate. *Id.* at 1372. In contrast, Camtek received notice and a hearing on the issue of contempt.

Am., 330 U.S. 258, 304 (1947). Plaintiffs lost profits because Camtek violated the injunction – regardless of whether Camtek was simultaneously infringing their patent – and the fine is intended to compensate Plaintiffs for the effects of Camtek’s noncompliance. *See McBride v. Coleman*, 955 F.2d 571, 579 (8th Cir. 1992) (“[A] compensatory sanction . . . serves to make reparation to the injured party, restoring that party to the position it would have held had the court’s order been obeyed.”) (internal quotation marks and citation omitted).

In sum, the Court finds that the injunction was valid and unambiguous at the time Camtek violated it, and the Court will reaffirm the portion of the March 2012 Order holding Camtek in contempt. The Court will, however, decrease the sanctions imposed from \$1,291,892 to \$645,946, payable to Plaintiffs. The sanction of \$645,946 is intended to compensate Plaintiffs for the profits they lost due to Camtek’s violation of the Court’s injunction.

C. Motion with Respect to Willfulness

Camtek also moves for Rule 60 relief from the 2011 Order’s finding of willful infringement and the March 2012 Order’s denial of its motion to set aside this finding.⁴ Rule 60(b)(5) allows a Court to relieve a party from an order or proceeding when “it is

⁴ In the alternative, Camtek seeks relief under Rule 59(e). “Rule 59(e) . . . motions serve the limited function of correcting manifest errors of law or fact or to present newly discovered evidence.” *Wells Fargo Bank, N.A. v. WMR e-PIN, LLC*, 653 F.3d 702, 714 (8th Cir. 2011) (internal quotation marks and citation omitted). Camtek claims it was a manifest error of law for the Court to decline to set aside the willful infringement finding. The Court refused to set aside the finding because the ruling on the motion was in Camtek’s favor. Then, as now, Camtek failed to demonstrate why it had standing to appeal a decision in its favor. There was no error of law in the Court’s denial of Camtek’s motion to set aside the finding of willful infringement.

based on an earlier judgment that has been reversed or vacated” Fed. R. Civ. P. 60(b)(5). Because a finding of willful infringement is necessarily dependent on a finding of infringement, following the Federal Circuit’s order vacating the finding of infringement, Camtek argues it cannot be a willful infringer.

The Court concludes that Camtek does not have standing to appeal the March 2012 Order because it was the prevailing party. *See Deposit Guaranty Nat’l Bank v. Roper*, 445 U.S. 326, 333 (1980) (“A party who receives all that he has sought generally is not aggrieved by the judgment affording the relief and cannot appeal from it.”) But, “[i]n an appropriate case, appeal may be permitted from an adverse ruling collateral to the judgment on the merits at the behest of the party who has prevailed on the merits, so long as that party retains a stake in the appeal satisfying the requirements of Art. III.” *Id.* at 334. To meet the standing requirements of Article III, the party must demonstrate, among other requirements, that it has suffered (1) an “injury in fact” – an invasion of a legally protected interest which is (a) concrete and particularized, and (b) actual or imminent, not ‘conjectural’ or ‘hypothetical’” *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560-61 (1992) (internal citations omitted). Camtek has not shown a concrete and particularized or imminent injury resulting from the willful infringement finding.⁵ Camtek presented no evidence that it has suffered reputational damage as the result of the

⁵ Additionally, “[a] party may not appeal from a judgment or decree in his favor, for the purpose of obtaining a review of findings he deems erroneous which are not necessary to support the decree.” *Bierle v. Liberty Mut. Ins. Co.*, 992 F.2d 873, 876 (8th Cir. 1993) (quoting *Electrical Fittings Corp. v. Thomas & Betts Co.*, 307 U.S. 241, 242 (1939)). The March 2012 Order denied Plaintiffs’ motion for enhanced damages **even though** it found Camtek was a willful infringer – that is, the finding that Camtek was a willful infringer was not necessary to support the Order’s **denial** of enhanced damages.

finding,⁶ nor can the Court discern any effect the finding would have on the ongoing proceedings. The Court will, therefore, deny Camtek's motion for relief on this ground because it finds Camtek lacks standing to bring the motion.

II. OBJECTION TO ORDER GRANTING ATTORNEYS' FEES AND COSTS

Camtek's only objection to the May 2012 Order granting attorneys' fees and costs was that the award should not go forward when it had challenged the underlying contempt holding. Because this objection is now moot, it will be overruled, and the Order will be affirmed.

ORDER

Based on the foregoing, and all the files, records, and proceedings herein, **IT IS HEREBY ORDERED** that:

1. Camtek Ltd's Rule 60 Motion for Relief from Contempt Order and Sanctions Award [Docket No. 780] is **GRANTED in part** and **DENIED in part**, as follows:

a. The motion is **GRANTED in part** with respect to sanctions. Camtek, Ltd. is relieved of the previous order [Docket #764] to pay double damages and, is ordered to pay Plaintiffs \$645,946 in lost profits, as a sanction for contempt.

⁶ Rank speculation that a finding of willful infringement in an otherwise favorable holding might cause damage to Camtek's business reputation is insufficient to show injury. *Roper*, 445 U.S. at 351 ("[U]nadorned speculation will not suffice to invoke the federal judicial power.") (quotation marks and citation omitted).

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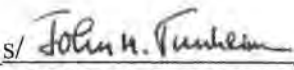
b. The motion is **DENIED** in all other respects.

2. Camtek Ltd.'s Rule 60 and Rule 59 Motion for Relief from Order Relating to Willfulness [Docket No. 790] is **DENIED**.

3. Camtek Ltd.'s Objections to the Magistrate Judge's Award of Fees and Costs [Docket No. 797] are **OVERRULED** as **moot**, and the Court **AFFIRMS** the Magistrate Judge's May 1, 2012 Order [Docket No. 795.].

LET JUDGMENT BE ENTERED ACCORDINGLY.

DATED: August 17, 2012
at Minneapolis, Minnesota.



JOHN R. TUNHEIM
United States District Judge

UNITED STATES DISTRICT COURT
District of Minnesota

AUGUST TECHNOLOGY CORPORATION
and RUDOLPH TECHNOLOGIES, INC.

JUDGMENT IN A CIVIL CASE

V.

Case Number: 05-cv-1396 (JRT/FLN)

CAMTEK, LTD.

- ☐ **Jury Verdict.** This action came before the Court for a trial by jury. The issues have been tried and the jury has rendered its verdict.
- ☒ **Decision by Court.** This action came to trial or hearing before the Court. The issues have been tried or heard and a decision has been rendered.

IT IS ORDERED AND ADJUDGED THAT:

1. Camtek Ltd's Rule 60 Motion for Relief from Contempt Order and Sanctions Award [Docket No. 780] is GRANTED in part and DENIED in part, as follows:
 - a. The motion is GRANTED in part with respect to sanctions. Camtek, Ltd. is relieved of the previous order [Docket #764] to pay double damages and, is ordered to pay Plaintiffs \$645,946 in lost profits, as a sanction for contempt.
 - b. The motion is DENIED in all other respects.
2. Camtek Ltd's Rule 60 and Rule 59 Motion for Relief from Order Relating to Willfulness [Docket No. 790] is DENIED.
3. Camtek Ltd.'s Objections to the Magistrate Judge's Award of Fees and Costs [Docket No. 797] are OVERRULED as moot, and the Court AFFIRMS the Magistrate Judge's May 1, 2012 Order [Docket No. 795].

August 30, 2012

Date

RICHARD D. SLETTEN, CLERK

s/L. Brennan

(By)

L. Brennan, Deputy Clerk



UNITED STATES DISTRICT COURT
District of Minnesota

Richard D. Sletten, Clerk
Lisa Rosenthal, Chief Deputy Clerk

Warren E. Burger Federal
Building and U.S. Courthouse
316 North Robert Street
Suite 100
St. Paul, MN 55101
(651) 848-1100

U.S. Courthouse
300 South Fourth Street
Suite 202
Minneapolis, MN 55415
(612) 664-5000

Gerald W. Heaney Federal Building and
U.S. Courthouse and Customhouse
515 West First Street
Suite 417
Duluth, MN 55802
(218) 529-3500

U.S. Courthouse
118 South Mill Street
Suite 212
Fergus Falls, MN 56537
(218) 739-5758

CIVIL NOTICE

The appeal filing fee is \$455.00. If you are indigent, you can apply for leave to proceed in forma pauperis, ("IFP").

The purpose of this notice is to summarize the time limits for filing with the District Court Clerk's Office a Notice of Appeal to the Eighth Circuit Court of Appeals from a final decision of the District Court in a civil case.

This is a summary only. For specific information on the time limits for filing a Notice of Appeal, review the applicable federal civil and appellate procedure rules and statutes.

Rule 4(a) of the Federal Rules of Appellate Procedure (Fed. R. App. P.) requires that a Notice of Appeal be filed within:

1. Thirty days (60 days if the United States is a party) after the date of "entry of the judgment or order appealed from;" or
2. Thirty days (60 days if the United States is a party) after the date of entry of an order denying a timely motion for a new trial under Fed. R. Civ. P. 59; or
3. Thirty days (60 days if the United States is a party) after the date of entry of an order granting or denying a timely motion for judgment under Fed. R. Civ. P. 50(b), to amend or make additional findings of fact under Fed. R. Civ. P. 52(b), and/or to alter or amend the judgment under Fed. R. Civ. P. 59; or
4. Fourteen days after the date on which a previously timely Notice of Appeal was filed.

If a Notice of Appeal is not timely filed, a party in a civil case can move the District Court pursuant to Fed. R. App. P. 4(a)(5) to extend the time for filing a Notice of Appeal. This motion must be filed no later than 30 days after the period for filing a Notice of Appeal expires. If the motion is filed after the period for filing a Notice of Appeal expires, the party bringing the motion must give the opposing parties notice of it. The District Court may grant the motion, but only if excusable neglect or good cause is shown for failing to file a timely Notice of Appeal.

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UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

August Technology Corporation and
Rudolph Technologies, Inc.,

Civil No. 05-1396 (JRT/FLN)

Plaintiffs,

v.

ORDER

Camtek, Ltd.,

Defendant.

Daniel W. McDonald and Thomas R. Johnson for Plaintiffs.
Wayne O. Stacy and William F. Mohrman for Defendant.

THIS MATTER came before the undersigned United States Magistrate Judge on July 30, 2012 on Camtek's Motion to Enforce the Court's Scheduling Order and Block Any Reliance on Darren James (ECF No. 858).¹

Camtek argues that Plaintiffs violated the Court's scheduling order by submitting the declaration of Darren James in support of their motion for summary judgment. The Court finds that Plaintiffs have not engaged in new fact discovery in violation of the Court's scheduling order. Further, the Court finds that there is no unfair surprise to Camtek, given that: Mr. James was identified by Camtek seven years ago as an employee who provided customer and sales support, Plaintiffs identified Mr. James as a witness in supplemental disclosures served May 9,

¹The motion has been under advisement pending reconvening of the settlement conference held the day following the hearing on the instant motion. That reconvened settlement conference was held on January 18, 2013. The case did not settle.

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2012, and Plaintiffs' expert Dr. Mundy relied on facts provided by Mr. James in his expert report served on May 15, 2012.

The Court recognizes that Mr. James and his testimony take on new importance in light of the amended claim construction provided by Federal Circuit, and that Camtek would suffer prejudice if not allowed to depose Mr. James prior to trial. The Court therefore denies Camtek's motion on the condition that Mr. James be produced for a deposition.²

Based upon the foregoing and all the files, records and proceedings herein, **IT IS HEREBY ORDERED** that Camtek's Motion to Enforce the Court's Scheduling Order and Block Any Reliance on Darren James (ECF No. 858) is **DENIED** provided that Plaintiffs produce Mr. James for a deposition no later than thirty (30) days from the date of this order. By this order, the Court is not reopening fact discovery or otherwise amending the scheduling order dated April 25, 2012.

DATED: January 24, 2013

s/ Franklin L. Noel
FRANKLIN L. NOEL
United States Magistrate Judge

²Mr. James is now an employee of Rudolph, but Mr. James' testimony concerns work he conducted as an employee of Camtek. Camtek should have the ability to rebut his testimony if it is in fact untrue. Camtek points to nothing in the record suggesting that Mr. James' testimony is untrue.

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**UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

AUGUST TECHNOLOGY
CORPORATION and RUDOLPH
TECHNOLOGIES, INC.,

Civil No. 05-1396 (JRT/FLN)

Plaintiffs,

**MEMORANDUM OPINION AND
ORDER**

v.

FILED UNDER SEAL

CAMTEK, LTD,

Defendant.

William D. Schultz and Daniel W. McDonald, **MERCHANT & GOULD PC**, 80 South Eighth Street, Suite 3200, Minneapolis, MN 55402, for plaintiff August Technology Corporation.

Daniel W. McDonald, **MERCHANT & GOULD PC**, 80 South Eighth Street, Suite 3200, Minneapolis, MN 55402, for plaintiff Rudolph Technologies, Inc.

Wayne O. Stacy, **COOLEY LLP**, 380 Interlocken Crescent, Suite 900, Broomfield, CO 80021; and William F. Mohrman, **MOHRMAN & KAARDAL**, 33 South Sixth Street, Suite 4100, Minneapolis, MN 55402, for defendant.

Plaintiffs August Technology Corporation and Rudolph Technologies, Inc. brought this patent infringement action against Defendant Camtek, Ltd. (“Camtek”) in 2005 alleging infringement of claims 1 through 5 of United States Patent No. 6,826,298 (the “6,298 patent”). The ‘6,298 patent is a system that inspects semiconductor wafers, the structures upon which microchips are manufactured. In 2009, a jury found that Camtek had infringed claims 1 and 3, which are the independent claims of the ‘6,298

patent. Camtek appealed the jury's determination arguing, among other things, that the Court had erred when it construed "wafer" to mean "[a] thin part of semiconductor material with circuitry thereon that is ready for electrical testing, or any part thereof." Camtek argued that the '6,298 patent requires that a system perform a variety of operations on multiple wafers, and that the Court's construction of the term wafer impermissibly allowed the jury to find infringement, even though Camtek's product allegedly only performs the operations on multiple portions of a single, physically discrete wafer.

The Federal Circuit agreed with Camtek, and construed the term "wafer" to mean "a thin, discrete slice of semiconductor material with circuitry thereon that is ready for electrical testing having one or more dies. A plurality of wafers means more than one physically distinct wafer." *August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1286 (Fed. Cir. 2011). The Federal Circuit therefore vacated the verdict of infringement, and remanded "for a limited trial on infringement with respect to this claim element." *Id.*

The case is now before the Court on Camtek's motion for claim construction, cross-motions for summary judgment on the issue of infringement, and three motions to exclude expert reports and testimony. Because the Court finds that Camtek's request for claim construction and certain elements of its summary judgment motion fall outside the scope of the Federal Circuit's remand, it will deny those motions. The Court will grant Rudolph's motion for summary judgment with respect to the training elements of claims 1 and 3, as no material issues of fact remain as to whether Camtek's product was capable of practicing the infringing method and did, in fact, practice such a method. Finally, the

Court will deny the motions to exclude the expert reports and testimony, as the issues raised in the motions go primarily to the weight, not the admissibility, of the expert reports and testimony.

BACKGROUND

Plaintiff August Technology Corporation developed the inventions resulting in the '6,298 patent which forms the basis of this action. (Thirty-Second Decl. of Joseph E. Lee, Ex. A, July 2, 2012, Docket No. 835.) Rudolph Technologies, Inc. purchased August Technology and Rudolph and August Technology (collectively, "Rudolph") are now co-owners of the '6,298 patent. Rudolph makes and sells automated visual inspection systems for the microelectronics industry, including systems for secondary inspection of semiconductor wafers.

Rudolph and Camtek are direct competitors in the market for automated wafer inspection systems. (Mem. Op. & Order ("*Markman* Order") at 2, Jan. 3, 2008, Docket No. 268.) In 2005, Rudolph sued Camtek for infringing claims 1 through 5 of the '6,298 patent with Camtek's device, the Falcon. (Compl., July 14, 2005, Docket No. 1.) Claims 1 and 3 are independent claims.

I. PATENT TECHNOLOGY BACKGROUND

The '6,298 patent embodies an invention related to the manufacture of semiconductors, which are vital to the design of electronic components and circuitry, including memory and computer processing circuits. (Thirty-Second Lee Decl., Ex. A 1:15-16, 41-46.) The manufacture of semiconductors begins with a wafer, which is a thin

layer of silicon crystal ranging from 4 to 12 inches in diameter. Through a number of processes, circuitry is deposited in layers upon the wafer. (*Id.*, Ex. A 1:65-67.) “The whole wafer with circuitry is then sawn into smaller pieces known in the industry as die,” which each contain an electronic circuit. (*Id.*, Ex. A 1:67-2:1.) Depending on the type of circuitry, anywhere from tens to thousands of individual die can be created on a single wafer. (First Decl. of Wayne Stacy, Ex. A 8:12-22, July 7, 2012, Docket No. 825.) A single die contains a complete electronic circuit, and is then removed from the wafer and packaged as an individual microchip. (See Thirty-Second Lee Decl., Ex A 2:47-50.)

The ‘6,298 patent is directed to a system and method for automatically inspecting the semiconductors printed on substrates such as wafers. *August Tech. Corp.*, 655 F.3d at 1282; (Thirty-Second Lee Decl., Ex. A 1:15-26.) Systems have been developed for inspecting semiconductors at various stages of their production. (Thirty-Second Lee Decl., Ex. A 2:4-5.) For example, bare wafers are typically inspected for imperfections or irregularities before any circuitry has been deposited upon them. (*Id.*, Ex. A 2:5-11.) The next level of inspection occurs during circuitry creation and is known in the industry as the “first optical inspection.” (*Id.*, Ex. A 2:12-29.) The ‘6,298 patent involves a method and system designed to perform the second optical inspection which occurs during and after sawing of the wafer into individual dies, after the whole wafer has been fully processed and circuitry deposition is complete. (*Id.*, Ex. 2:30-46.) This second optical inspection examines the fully processed wafer for a number of defects, from scratches and corrosion to scribing errors. (*Id.*; First Stacy Decl., Ex. C at 13.) Prior to Rudolph’s invention resulting in the ‘6,298 patent, the second optical inspection was

typically done manually and was expensive as well as fraught with inaccuracies. (Thirty-Second Lee Decl., Ex. A 3:9-20.)

II. THE '6,298 PATENT

The '6,298 patent contains five claims, 1 and 3 being the independent claims that are at issue in the present motions.

A. Infringement Claim

1. Claim 1

Claim one of the '6,298 patent recites:

An automated system for inspecting a substrate such as a wafer in any form including whole patterned wafers, sawn wafers, broken wafers, and wafers of any kind on film frames, dies, die in gel paks, die in waffle paks, multi-chip modules often called MCMs, JEDEC trays, Auer boats, and other wafer and die package configurations for defects, the system comprising:

a wafer test plate;

a wafer provider for providing a wafer to the test plate;

a visual inspection device for visual inputting of a plurality of known good quality wafers during training and for visual inspection of other unknown quality wafers during inspection;

at least one of a brightfield illuminator positioned approximately above, a darkfield illuminator positioned approximately above, and a darkfield laser positioned approximately about the periphery of the wafer test plate, all of which are for providing illumination to the unknown quality wafers during inspection and at least one of which strobes to provide short pulses of light during movement of a wafer under inspection based on a velocity of the wafer; and

a microprocessor having processing and memory capabilities for developing a model of good quality wafer and comparing unknown quality wafers to the model.

(*Id.*, Ex. A 20:55-21:9.)

2. Claim 3

Claim three of the '6,298 patent provides:

An automated method of inspecting a semiconductor wafer in any form including whole patterned wafers, sawn wafers, broken wafers, and wafers of any kind of film frames, dies, die in gel paks, die in waffle paks, multi-chip modules often called MCMs, JEDEC trays, Auer boats, and other wafer and die package configurations for defects, the method comprising:

training a model as to parameters of a good wafer via optical viewing of multiple known good wafers;

illuminating unknown quality wafers using at least one of a brightfield illuminator positioned approximately above, a darkfield illuminator positioned approximately above, and a darkfield laser positioned approximately about the periphery of a wafer test plate on which the wafer is inspected, all of which are for providing illumination to the unknown quality wafers during inspection and at least one of which flashes on and off during movement of a wafer under inspection at a sequence correlating to a velocity of the wafer; and

inspecting unknown quality wafers using the model.

(*Id.*, Ex. A 21:17-22:15.)

III. PROCEDURAL HISTORY

This case has extensive procedural history some of which provides useful background for the factual issues relevant to the current motions. This Order therefore addresses the relevant procedural history first, before discussing the facts regarding

Camtek's allegedly infringing product, the Falcon, in the context of the parties' various motions.

A. Markman Hearing

In a January 3, 2008 *Markman* order, the Court construed a number of terms in the '6,298 patent which are relevant to the current motions, including:

Wafer. The Court construed "wafer" to mean "[a] thin slice of semiconductor material with circuitry thereon that is ready for electrical testing, or any part thereof." (*Markman* Order at 8, 11.)

Training. The Court construed training to mean "[e]xamining wafers to develop a model of a good quality wafer." (*Id.* at 20.) In adopting this construction, the Court rejected Rudolph's construction which incorporated "telling the system what a 'good die' comprises, and viewing good die to form a model based on common characteristics, elements, and ranges. The model is then used to inspect die to locate defects." (*Id.* at 19-20 (internal citation omitted).) Instead, the Court found that "Plaintiffs[]" reliance on the step in which the model is used to inspect die to locate defects is a step separate from training, and need not be used to define training." (*Id.* at 20.)

Unknown Quality Wafer. The Court construed "unknown quality wafer" to mean "[w]afers for which the location of one or more defects, if any, is not identified or ascertained prior to inspection." (*Id.* at 13-14.)

Plurality of Known Good Quality Wafers/Multiple Known Good Wafers. The Court construed this term to mean "[m]ultiple 'wafers' that are recognized individually or

as a whole to be sufficiently free of defects for training purposes (e.g. die that have been inspected, tested, or otherwise reviewed prior to or during training).” (*Id.* at 11-12.) The Court noted that its construction was consistent with the ‘6,298 patent’s specifications which state that the system “conducts die inspection by studying a user provided set of known good die” and that “the definition of a good die depends on user provided information.” (*Id.* at 12 (citing Thirty-Second Lee Decl., Ex. A 12:13-15, 12:67-13:4).)

B. Trial

An eighteen-day jury trial was held from February 2, 2009, through March 5, 2009. (*See* Court Minutes, Feb. 2, 2009, Docket No. 406; Court Minutes, Mar. 5, 2009, Docket No. 465.) At trial, Camtek disputed infringement, arguing that three elements of claim 1 were absent from the Falcon:

(1) a visual inspection device for visual inputting of a plurality of known good quality wafers during training and visual inspection of other unknown quality wafers during inspection; (2) an illuminator that strobes to provide short pulses of light during movement of a wafer under inspection based on a velocity of the wafer; and (3) a microprocessor for developing a model of a good quality wafer and comparing unknown quality wafers to the model

(Final Jury Instruction 13, Mar. 3, 2009, Docket No. 463.) Camtek did “not dispute that the Falcon includes the other features of claim 1, which includes the wafer test plate, wafer provider, and brightfield and darkfield illuminators.” (*Id.*) Camtek also disputed that it practiced the following steps of the claimed inspection method for purposes of claim 3:

(1) training a model as to parameters of a good wafer via optical viewing of multiple known good wafers; (2) illuminating unknown quality wafers with an illuminator that flashes on and off during movement of a wafer under

inspection at a sequence correlating to a velocity of the wafer; and (3) inspecting unknown quality wafers using the model.

(*Id.*) Camtek did “not dispute that Camtek practices the other steps of claim 3.” (*Id.*)

For the remainder of this Order, the Court will refer to disputed element one as the “training element,” disputed element two as the “strobing element,” and disputed element three as the “microprocessor/inspection element” for purposes of both claims 1 and 3.

After trial, the jury returned a special verdict finding that Camtek and its Falcon device literally infringed both claims 1 and 3 of the ‘6,298 patent. (Special Verdict Form at 1-4, Mar. 5, 2009, Docket No. 466.) Additionally, the jury rejected both of Camtek’s invalidity defenses, finding that Camtek had failed to prove by clear and convincing evidence that the asserted claims 1 and 3 were obvious and also finding that Rudolph’s NSX-80 device was not on sale prior to the ‘6,298 patent’s critical date. (*Id.* at 5.) Finally, the jury found that Camtek’s infringement was not willful, and awarded \$6,782,490 in lost profits to Rudolph. (*Id.* at 6-7.)

The Court denied Camtek’s motion for judgment as a matter of law or a new trial on validity, infringement, and damages. (Mem. Op. & Order at 2, Aug. 25, 2009, Docket No. 545.) Specifically, the Court rejected Camtek’s argument that Rudolph’s NSX-80 device was on sale prior to the ‘6,298 patent’s critical date, and that the Court had erred in instructing the jury with respect to the meaning of “on sale.” (*Id.* at 3-6.) The Court also determined that the jury verdict was not against the clear weight of the evidence with respect to the date of sale of the NSX-80 device. (*Id.* at 7-8.) Finally, the Court granted Rudolph’s motion to dismiss Camtek’s inequitable conduct defense and counterclaim,

which had previously been bifurcated from the original trial, because those theories of defense had been precluded by the jury verdict. (*Id.* at 2, 8-12.)

The Court denied Camtek's three additional motions for judgment as a matter of law on July 27, 2010. (*See* Mem. of Law & Order, July 27, 2010, Docket No. 644.) In these later-filed motions, Camtek argued that no reasonable jury could have found infringement on the "plurality of wafers" limitation of claim 1 and the "multiple wafers" limitation of claim 3 because "claims 1 and 3 require more than one wafer be visually inputted or optically viewed during training, but that the Falcon machines visually input only multiple dies on a single wafer during training." (*Id.* at 5-6.) The Court found that under its construction of the term wafer, the jury could reasonably have found infringement because "the Falcon visually inputs sections of multiple die from different parts of a whole wafer." (*Id.* at 7.) Camtek also argued that the Falcon creates a model die, not a model wafer and that the Falcon used a position-based method of strobing a light as opposed to a velocity-based system. (*Id.* at 7-10.) The Court rejected both of these arguments finding that a reasonable jury could have found infringement based on the evidence presented at trial. (*Id.*)

C. Appeal

On appeal to the Federal Circuit, Camtek challenged the validity and enforceability of the '6,298 patent, the jury's damage award, and the permanent

injunction entered by the district court. (Thirty-Second Lee Decl., Ex. E.)¹ Camtek also argued error with respect to two infringement issues. (*See id.*, Ex. E.) Camtek argued first that the Falcon “trains on only a single wafer, not multiple wafers,” and second, that “the Falcon strobe is based on the position of the wafer not the velocity of the wafer.” (*Id.*, Ex. E at 5, 31, 43.) Camtek did not appeal the jury’s determination with respect to the microprocessor/inspection element. With respect to the two infringement issues raised, Camtek argued that the district court committed legal error in its claim constructions and that those errors led to the jury’s erroneous finding of infringement. (*Id.*, Ex. E at 14.)

With respect to the single versus multiple wafer issue, Camtek argued that the district court had erred when it construed the term wafer as “a thin slice of semiconductor material with circuitry thereon that is ready for electrical testing, **or any part thereof**” because, Camtek contended “a ‘wafer’ is not the same as a ‘die.’ A wafer is made up of multiple die[s].” *August Tech. Corp.*, 655 F.3d at 1282 (emphasis in original). The ‘6,298 patent requires a system for “visual inputting **a plurality of known good quality wafers** during training.” *Id.* at 1283 (emphasis added). Camtek argued that the Falcon only trains individual die which can all be found on a single wafer, (Thirty-Second Lee Decl., Ex. E at 43-44), and that the district court’s construction of wafer erroneously allowed the jury to find infringement even though the Falcon did not train on a plurality of known wafers, *August Tech. Corp.*, 655 F.3d at 1283. Specifically, Camtek argued

¹ Page references to Exhibit E of the Thirty-Second Lee Declaration refer to the CMECF pagination.

“that the district court erred by including the ‘or any part thereof’ phrase in its construction, asserting that such a definition ‘erroneously permits a single physical wafer to have an arbitrary number of notional ‘wafers’ within it.” *Id.* (citation omitted). In its briefing on appeal, Camtek’s objections to the district court’s construction of wafer were tied to the training element of claims 1 and 3, specifically “training on multiple wafers of known good quality: ‘plurality of known quality wafers’ (claim 1) and ‘multiple known good wafers’ (claim 3).” (Thirty-Second Lee Decl., Ex. E at 20-21).

The Federal Circuit agreed with Camtek that the district court had erred in its construction of “wafer,” and therefore set out to “determin[e] the meaning of the plurality of wafers limitations.” *August Tech. Corp.*, 655 F.3d at 1284. The court determined that “a wafer is a discrete object, and thus a single wafer, even though it may later be diced into hundreds of separate dies, is not itself also a plurality of wafers.” *Id.* at 1285. The court specifically concluded that Rudolph had chosen to draft a patent “directed to training on and inspecting multiple discrete wafers,” not multiple and discrete dies. *Id.* at 1286 (emphasis added). In light of the district court’s error, the Federal Circuit provided a new construction for the term “wafer,” holding that:

The district court’s construction is in error so far as it defines a wafer as any portion of a wafer having two or more dies. We construe a wafer as recited in the claims at issue as a thin, discrete slice of semiconductor material with circuitry thereon that is ready for electrical testing having one or more dies. A plurality of wafers means more than one physically distinct wafer.

Id. Under this construction “wafer” can include a single die, but in order for multiple die to constitute multiple wafers, the dies must be located on physically discrete wafers. *Id.*

Because of the flawed claim construction of the term “wafer,” the Federal Circuit vacated the verdict of infringement and remanded the case to the district court “for a limited trial on infringement with respect to this claim element.” *Id.*

Because it found that the district court had erred in its claim construction, the Federal Circuit “vacate[d] the district court’s judgment of infringement, its award of damages, and its grant of a permanent injunction, and remand[ed] for further proceedings consistent with [its] opinion.” *Id.* at 1281. The Federal Circuit therefore did “not reach the parties’ contentions regarding damages and the injunction.” *Id.* at 1290. The court went on to advise the district court that in the event it found Camtek’s Falcon to infringe under the new claim construction of “wafer,” it should take into account the effect, if any, of *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296 (Fed. Cir. 2010), when crafting an appropriate injunction. *August Tech.*, 655 F.3d at 1291.²

With respect to the error alleged by Camtek regarding the strobing infringement claim, the Federal Circuit concluded that the district court had not erred in its analysis and held that “the district court need not include the strobing limitation in its retrial on infringement.” *August Tech. Corp.*, 655 F.3d at 1287.

² The Federal Circuit also rejected Camtek’s arguments regarding the validity and enforceability of the ‘6,298 patent, and affirmed the district court’s determinations regarding nonobviousness and lack of prior art. *August Tech. Corp.*, 655 F.3d at 1287-90.

D. Motion for Bifurcation

Upon remand from the Federal Circuit, Camtek moved for an order bifurcating the remand trial into an infringement phase and a remedies phase. (Mot. to Bifurcate, June 1, 2012, Docket No. 798.)³ United States Magistrate Judge Franklin L. Noel denied Camtek's motion for bifurcation. (Order, June 26, 2012, Docket No. 816.) The Magistrate Judge concluded, based on the Federal Circuit's remand, that "[t]here is no need for a new trial on damages. In the event infringement is found, the original damage award will be reinstated. . . . In the event Camtek's Falcon machine is found to infringe after a new trial, the District Court will then craft an appropriate injunction." (*Id.* at 3.) Because the Magistrate Judge found that "the scope of an appropriate injunction is at issue on remand," he determined that "expert reports on the injunction issues are appropriate." (*Id.*) Therefore, the Magistrate Judge also denied Camtek's "request that Plaintiffs be required to withdraw the Second Supplemental Report of Frances McCloskey." (*Id.*)⁴

The parties now bring various motions to resolve the issues remanded by the Federal Circuit. Camtek contends that the scope of the Federal Circuit's remand is broad and puts at issue each claim in the '6,298 patent that contains the term "wafer," with the

³ After ordering Camtek to pay sanctions following remand, Chief Judge Davis recused from the case, determining that he could "no longer be fair and impartial." (Order of Recusal, Apr. 10, 2012, Docket No. 772.) Therefore, the case was reassigned to this Court in April 2012. (Notice of Reassignment, Apr. 10, 2012, Docket No. 773.)

⁴ Camtek has appealed the Magistrate Judge's order, and that appeal is currently pending before the Court. (Objections, July 10, 2012, Docket No. 855.)

exception of the strobing element. Consequently, Camtek moves for claim construction of the terms “unknown quality wafers” and “model.” Camtek also moves for summary judgment of non-infringement with respect to both the training and microprocessor/inspection elements of claims 1 and 3. Camtek’s arguments regarding non-infringement are largely premised on its contention that the Falcon is a “**die**-inspection system” rather than a “**wafer**-inspection system” like the ‘6,298 patent. (*See* Def.’s Mem. in Supp. of Mot. for Claim Construction & Summ. J. at 5, July 2, 2012, Docket No. 824 (emphasis in original).) Essentially, with respect to the training and microprocessor/inspection elements which both require infringing machines to perform certain operations with multiple wafers, Camtek argues that the Falcon performs these operations using multiple die instead of multiple wafers.

Rudolph argues that the only issues remaining following the Federal Circuit’s ruling relate to the training elements of claims 1 and 3. Specifically, Rudolph argues that the sole questions before the Court are whether the Falcon is “capable of being trained with **multiple**, physically **discrete** wafers to infringe claim 1,” and whether Camtek “trained the Falcon with **multiple**, physically **discrete** wafers to infringe claim 3.” (Pls.’ Mem. in Supp. of Mot. for Summ. J. at 1-2, July 2, 2012, Docket No. 834 (emphasis in original).) Rudolph contends that it is entitled to summary judgment with respect to the training element of both claims 1 and claims 3.

ANALYSIS

I. SCOPE OF REMAND

As an initial matter, the parties dispute the scope of the Federal Circuit's remand and what issues are therefore appropriate either for summary judgment or retrial. Rudolph argues that on remand the Court need only consider whether the Falcon is capable of being **trained** with multiple, physically discrete wafers. Specifically Rudolph argues that the Federal Circuit's remand does not reopen the trial for any claims which involve "wafers" but rather is limited to (1) whether the Falcon has "a visual inspection device for visual inputting of a plurality of known good quality wafers during training" and (2) whether Camtek used the Falcon by "training a model as to parameters of a good wafer via optical viewing of multiple know good wafers." (*See* Pls.' Mem. in Opp'n to Def.'s Mot. for Claim Construction & Summ. J. at 8, July 23, 2012, Docket No. 876.) Camtek argues, on the other hand, that both the microprocessing/inspection element and the training element are subject to retrial.

A. The Mandate Rule

The mandate rule requires a district court to follow an appellate decree as the law of the case. *Sibbald v. United States*, 37 U.S. 488, 492 (1838). "The mandate rule provides that 'issues actually decided [on appeal] – those within the scope of the judgment appealed from, minus those expressly reserved or remanded by the court – are foreclosed from further consideration.'" *Amado v. Microsoft Corp.*, 517 F.3d 1353, 1360 (Fed. Cir. 2008) (quoting *Engel Indus., Inc. v. Lockformer Co.*, 166 F.3d 1379, 1383

(Fed. Cir. 1999)). The scope of issues possibly foreclosed by an appeal is measured “by the scope of the judgment appealed from, not by the arguments advanced by the appellant.” *Engel Indus., Inc.*, 166 F.3d at 1382 (citations omitted). The Federal Circuit explained that its responsibility to review judgments appealed to it

can be properly discharged only if the court assumes that the appellant has fully set forth its attack on the judgment below; only then will the court be able to address with confidence the range of issues determined by the appealed judgment. In other words, the court is entitled to assume that an appellant has raised all issues it deems important against a judgment appealed from. An issue that falls within the scope of the judgment appealed from but is not raised by the appellant in its opening brief on appeal is necessarily waived. Unless remanded by this court, all issues within the scope of the appealed judgment are deemed incorporated within the mandate and thus are precluded from further adjudication.

Id. at 1383.

When the Federal Circuit reverses a district court’s claim construction, a mandate on remand usually leaves open the “possibility that a new claim construction ruling may raise directly related new issues.” *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 576 F.3d 1348, 1356 (Fed. Cir. 2009) (internal quotation marks omitted). The Court must carefully consider the Federal Circuit’s “explicit instructions” on remand in determining what claims are appropriately before it. *Id.*

B. Scope of the Federal Circuit’s Opinion

The Court concludes that the Federal Circuit limited the issues on remand to the training elements of claims 1 and 3 as they relate to the use of multiple, physically discrete wafers. Although the Federal Circuit’s opinion is not entirely explicit as to the proper scope of remand, the Court finds that the arguments raised by the parties on appeal

and the precise wording and construction of the Federal Circuit's opinion support its conclusion.

First, Camtek conceded at trial that it disputed infringement with respect to only three elements of claims 1 and 3. (*See* Final Jury Instruction 13.) After the jury found that the Falcon infringed with respect to each of these elements, Camtek appealed to the Federal Circuit and in its opening brief challenged only the findings with respect to the training element and the strobing element. Specifically, Camtek argued that the district court erred in construing wafers by not requiring a "plurality of known good quality wafers" and "multiple known good wafers" as used in the training element of claims 1 and 3 to require more than one physically distinct substrate. (Thirty-Second Lee Decl., Ex. E at 31-33, 37-38.) Camtek argued that this error in construction warranted reversal because the errors "caused the jury to erroneously find the claims valid and infringed." (*Id.*, Ex. E at 31.) The only argument Camtek raised regarding jury error arising out of the Court's construction of wafers was that the jury erred in finding infringement because "the Falcon **trains** on only a single wafer, not multiple wafers." (*Id.*, Ex. E at 43-46 (emphasis added).)

Camtek's failure to argue in its brief that the district court's construction of wafer also resulted in an erroneous jury verdict with respect to the microprocessor/inspection element provides strong evidence that the Federal Circuit's remand did not include that element. This is so because even if the Federal Circuit finds that a district court's claim construction is incorrect, it will reverse only if that construction impacted the jury verdict. *See Z4 Techs., Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1349 (Fed. Cir. 2007)

(declining to reverse because “a reasonable juror could find that Microsoft infringed the asserted claims notwithstanding our modification of the district court’s construction of the term user”). Accordingly, because Camtek did not present the issue of jury error related to the microprocessor/inspection claim to the Federal Circuit, that claim was not included in the scope of the Federal Circuit’s remand. *See United States v. Husband*, 312 F.3d 247, 250 (7th Cir. 2002) (explaining that “[a]ny issue that could have been but was not raised on appeal is waived and thus not remanded”); *Engel Indus., Inc.*, 166 F.3d at 1383 (“An issue that falls within the scope of the judgment appealed from but is not raised by the appellant in its opening brief on appeal is necessarily waived. Unless remanded by this court, all issues within the scope of the appealed judgment are deemed incorporated within the mandate and thus are precluded from further adjudication.”).

Second, the Federal Circuit’s opinion itself confirms that remand is limited to the issue of training under claims 1 and 3. In ascertaining the scope of remand, the Court looks to the appellate opinion as a whole. *Husband*, 312 F.3d at 251. “[I]f the opinion identifies a discrete, particular error that can be corrected on remand without the need for a redetermination of other issues, the district court is limited to correcting that error.” *Id.* (internal quotation marks omitted). Where an appellate court does not address an argument explicitly “the implication is that . . . [the court] thought so little of the point that [it] did not see a need to discuss it, or the party did not invoke and thereby waived the point. The court’s silence on the argument implies that it is not available for consideration on remand.” *Id.* (alterations, internal citations, and internal quotation marks omitted).

In its opinion, the Federal Circuit began by acknowledging that “[t]he dispute in this case centers around whether ‘a wafer’ is also ‘a plurality of wafers,’” and specifically cited the training element of claim 1 as framing the dispute. *August Tech. Corp.*, 655 F.3d at 1282-83 (“Claim 1 requires ‘visual inputting a plurality of known good quality wafers during training’ to teach the system a standard for detecting defects. The district court referred to this ‘plurality of known good quality wafers’ limitation as the multiple wafer limitation. This limitation requires multiple good wafers to be used to train the system – so the inspection device will know a flawed wafer when it sees one.”). The court then went on to “determine the meaning of the plurality of wafers limitations” and continued to focus on the import of the construction of wafer as it relates to the training element. *Id.* at 1284; *see also id.* at 1285 (noting that “[t]he disclosure therefore teaches both using multiple die and multiple wafers **to train** (emphasis added); *id.* (“The fact that the claims at issue cover only the latter – **a plurality of known good wafers** – is little cause for concern.” (emphasis added).)

The Federal Circuit then “remand[ed] to the district court **for a limited trial** on infringement with respect to **this claim element.**” *Id.* at 1286 (emphasis added). Notably, a wafer itself is not a “claim element.” (*See* Mem. Op. & Order at 8, July 14, 2008, Docket No. 294 (“The innovation of the ‘6,298 patent is an automated wafer inspection system – not the wafers themselves. The wafers **are not claimed**, they are referenced solely with respect to the capabilities of the system – training and inspection.” (emphasis added))). Therefore when remanding with respect to “this claim element” the Federal Circuit could not have been referring generally to the term “wafers” as it is used

anywhere in the '6,298 patent. Instead, the court was referring to the single element claimed by the '6,298 patent that it discussed in the opinion – the training element as it relates to a plurality of known good wafers. The Federal Circuit's focus on the training element and its explicit statement that it was determining the meaning "of the plurality of wafers limitations" which appear only in the training elements of claims 1 and 3 indicates that the remand with respect to "this claim element" is a remand for retrial as to the training element or limitation.⁵

Finally, the Court concludes that its interpretation of the scope of the Federal Circuit's remand is supported by Camtek's stipulation that retrial was limited to the

⁵ Camtek argues that the Federal Circuit intended to remand on all issues related to wafers because it used the term "claim element" as opposed to "claim limitation" in its description of the "limited trial on infringement." (*See* Def.'s Mem. in Opp'n to Mot. for Summ. J. at 13 & n.6, July 23, 2012, Docket No. 865.) As support Camtek cites *Dawn Equipment Co. v. Kentucky Farms Inc.*, 140 F.3d 1009 (Fed. Cir. 1998), which noted that "each claim limitation must be present in the accused product, literally or equivalently," and that "this court has moved towards the custom of referring to claim 'limitations,' reserving the word 'elements' for describing the parts of the accused device, though the court on occasion continues to use the words interchangeably." *Id.* at 1014 & n.1. But recent cases from the Federal Circuit suggest that the court has continued to use the words interchangeably. *See, e.g., Regents of Univ. of Minn. v. AGA Med. Corp.*, 717 F.3d 929, 944 (Fed. Cir. 2013) ("The appropriate focus is on the scope of the **claim element**, not the meaning of particular words in isolation. This is why our cases evaluate the similarity between the earlier and later **claim limitations**" (emphasis added)); *Mettler-Toledo, Inc. v. B-Tek Scales, LLC*, 671 F.3d 1291, 1296 (Fed. Cir. 2012) ("We agree with the district court that the appropriate structure for the disputed means-plus-functions **claim elements** in the '547 patent is the multiple slope integrating A/D converter and equivalents thereof. Our case law is clear that a means-plus-functions **claim limitation** is limited to the structures disclosed in the specification and equivalents." (emphasis added)). Additionally, the distinction identified by Camtek makes little sense in the context of the Federal Circuit's statement in connection with remand, because the Federal Circuit was not remanding based on a new construction of "part[] of the accused device." *See Dawn Equip. Co.*, 140 F.3d at 1014, n.1. The Federal Circuit was plainly remanding because it found that the district court had erred in defining the aspects of training that require a "plurality of known good quality wafers" or "multiple known good wafers" in order to constitute infringement. Accordingly, the Court determines that Camtek's proposed differentiation between claim element and claim limitation does not change its interpretation of the scope of remand.

training elements of claims 1 and 3. Pursuant to an order from the Court, the parties filed a joint statement in April 2012. (Notice of Case Management Conference, Mar. 21, 2012, Docket No. 763; Joint Statement, Apr. 13, 2012, Docket No. 778.) In the statement, the parties agreed that “there is one infringement issue to be resolved on remand: whether the accused Falcon machines meet the boldfaced portions of the following claim limitations, with the “wafer” and “plurality of”/“multiple” wafer limitations:

Claim 1: An automated system . . . comprising:

a visual inspection device for visual inputting of a **plurality of known good wafers** during training and for visual inspection of other unknown quality wafers during inspection

...

and

Claim 3: An automated method . . . comprising:

training a model as to parameters of a good wafer via optical viewing of **multiple known good wafers**

(Joint Statement at 4.) The only disagreement the parties identified with regard to the retrial of infringement was that Camtek “denie[d] that the accused Falcon machines infringe the asserted claims.” (*Id.* at 4.) Camtek also stated in the joint statement that it believed a two-day trial with no more than five hours of evidence presentation per side was sufficient based on its understanding of the limited scope of retrial. (*Id.* at 8.) Although Camtek later determined that it did not agree with the position it had taken in the joint statement regarding the scope of retrial (*see* Second Decl. of Wayne Stacy, Ex. 1, July 23, 2012, Docket No. 866) the Court finds that the joint statement provides further

evidence of the Federal Circuit's scope of remand. Accordingly, the Court finds that the only issues it may properly address in connection with the present motions are those which relate to the training elements of claims 1 and 3. Camtek's arguments for summary judgment on the microprocessor/inspection element are not properly before this Court on remand, and the Court will therefore deny Camtek's motions to the extent they seek relief unrelated to the training elements.⁶

II. MOTION FOR CLAIM CONSTRUCTION

Camtek seeks claim construction of three terms – “unknown quality wafers,” “model of good quality wafer,” and “a model.” (Mot. for Claim Construction & Summ. J. at 1, July 2, 2012, Docket No. 823.) Generally if a claim construction previously ordered by the district court is not reversed by the Federal Circuit “it is the law of the case,” and cannot be revisited on remand. *See Rosco, Inc. v. Mirror Lite Co.*, 506 F. Supp. 2d 137, 154 (E.D.N.Y. 2007). On remand, new claims may be construed only if the new claim construction is “directly related” to the new issues raised by the remand. *See Cardiac Pacemakers, Inc.*, 576 F.3d at 1356.

⁶ Rudolph argues that it is entitled to attorneys' fees for costs it has incurred in responding to Camtek's motion for claim construction and summary judgment because Camtek has needlessly prolonged the litigation by attempting to relitigate issues that have already been decided and has maintained its position that all issues of infringement with the exception of the strobing element are subject to relitigation in bad faith. (See Pls.' Mem. in Opp'n to Mot. for Claim Construction & Summ. J. at 38-40.) Although the Court concludes that the issues raised by Camtek unrelated to the training element are not properly before the Court, it finds that Camtek's arguments, although incorrect, were within the bounds of zealous advocacy and do not present a clearly unreasonable or bad faith interpretation of the Federal Circuit's mandate. Accordingly, the Court will deny Rudolph's request for attorneys' fees.

A. Unknown Quality Wafers

The Court already construed the term “unknown quality wafers” in its *Markman* hearing, and Camtek did not appeal that determination. (See *Markman* Order at 13-14.) Specifically, the Court previously defined the term as “[w]afers for which the location of one or more defects, if any, is not identified or ascertained prior to inspection.” (*Id.*) Camtek has identified no aspect of the Federal Circuit’s construction of the term “wafers” that would require the Court to alter its construction of the term “unknown quality wafers” other than by adopting the Federal Circuit’s definition of plural wafers. Accordingly, the Court finds that new claim construction is unwarranted. Furthermore, this term appears only in the elements of the ‘6,298 patent related to the microprocessor/inspection element. The fact that these elements are not in issue on remand is another reason that claim construction is improper.

B. Model of a Good Quality Wafer and Model

Camtek also seeks claim construction of the term “model of a good quality wafer” and “model.” Camtek argues that the Court should construe “model” as “a collection of pixels representing a perfect wafer.” (Def.’s Mot. for Claim Construction & Summ. J. at 16.) Although Camtek did not previously seek construction of the term “model wafer,” the Court previously interpreted the term in the context of some of Camtek’s post-trial motions. Specifically, the Court found that a model wafer is one “with all of the necessary characteristics to inspect an unknown quality wafer.” (Mem. of Law & Order

at 8, July 27, 2010, Docket No. 644.) Camtek did not challenge this interpretation on appeal.

Camtek appears to argue, however, that the Federal Circuit's remand on the issue of a plurality of wafers requires a new construction of the term model wafer because "[n]o jury has ever considered whether the Falcon develops a 'model wafer' using the correct constructions." (Def.'s Reply in Supp. of Mot. for Claim Construction & Summ. J. at 9, Aug. 6, 2012, Docket No. 893.) Specifically Camtek argues that the Falcon develops a model **die**, not a model **wafer**, and therefore cannot infringe the '6,298 patent. (See, e.g., Def.'s Mem. in Opp'n to Mot. for Summ. J. at 17, July 23, 2012, Docket No. 865.) But Camtek's argument relies on the fundamental misunderstanding that "[a] die, which is merely a part of a wafer, is not a 'wafer' under the Federal Circuit's construction." (*Id.* at 7; see also Def.'s Mem. in Supp. of Mot. for Claim Construction & Summ. J. at 8 ("[T]he Court need only affirm and enforce the Federal Circuit's holding that a 'wafer' cannot mean or refer to a portion of a wafer. . . .")) Camtek is simply wrong about the Federal Circuit's construction of wafer. Contrary to Camtek's assertion, the Federal Circuit clearly stated that a wafer could be a single die. See *August Tech. Corp.*, 655 F.3d at 1285 ("[T]he claims neatly accommodate a wafer in any discrete format, such as a whole wafer, a discrete portion of a wafer (a sawn wafer or a broken wafer), and even a discrete physical substrate that includes **only an individual die.**" (emphasis added)). What the Federal Circuit **did** hold, is that in order to have the multiple wafers necessary to constitute infringement of the training claims, the Falcon must perform its operations on multiple discrete wafers – even if on those wafers it

performs the operations with respect to only a single die – not multiple die contained on the same wafer. *Id.* at 1287.

The terms “model of a good quality wafer” and “model” are **singular**, therefore the Federal Circuit’s holding regarding the ‘6,298 patent’s requirements for **plural** wafers – e.g., what it means for there to be more than one wafer used in a specific process – is irrelevant to the construction of the term “model,” and does not put that term newly at issue on remand. In other words, because the Federal Circuit’s construction of wafer explicitly states that a wafer can be a single die, the difference between a “model die” and a “model wafer” as postulated by Camtek is irrelevant, and Camtek has presented no evidence that in light of the Federal Circuit’s new construction of the term “wafers” the jury could have erroneously concluded that Camtek created a model wafer. If Camtek wished to have the Court define model as “a collection of pixels representing a perfect wafer” it should have asked for the claim to be construed in the original trial. If Camtek wished to dispute the Court’s interpretation that a model wafer is one “with all of the necessary characteristics to inspect an unknown quality wafer,” (Mem. of Law & Order at 8), it should have asked the Federal Circuit to review that determination. Because reconstruction of the term “model” is not properly at issue on remand, the Court will deny Camtek’s motion for claim construction and will apply the term previously construed by the Court as the law of the case.

III. MOTIONS FOR SUMMARY JUDGMENT

A. Standard of Review

Summary judgment is appropriate where there are no genuine issues of material fact and the moving party can demonstrate that it is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(a). A fact is material if it might affect the outcome of the suit, and a dispute is genuine if the evidence is such that it could lead a reasonable jury to return a verdict for either party. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986). A court considering a motion for summary judgment must view the facts in the light most favorable to the non-moving party and give that party the benefit of all reasonable inferences to be drawn from those facts. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 587 (1986). Summary judgment is appropriate if the nonmoving party “fails to make a showing sufficient to establish the existence of an element essential to that party’s case, and on which that party will bear the burden of proof at trial.” *Celotex Corp. v. Catrett*, 477 U.S. 317, 322 (1986). “To defeat a motion for summary judgment, a party may not rest upon allegations, but must produce probative evidence sufficient to demonstrate a genuine issue [of material fact] for trial.” *Davenport v. Univ. of Ark. Bd. of Trs.*, 553 F.3d 1110, 1113 (8th Cir. 2009) (citing *Anderson*, 477 U.S. at 247-49). When “there is no dispute regarding the operation of the accused system[], that issue reduces to a question of claim interpretation and is amenable to summary judgment.” *MyMail, Ltd. v. Am. Online, Inc.*, 476 F.3d 1372, 1378 (Fed. Cir. 2007).

B. Training Element⁷

Rudolph and Camtek both move for summary judgment on the issue of whether the Falcon involves “visual inputting of a plurality of known good quality wafers during training” as required to infringe the training element of claim 1 and whether the Falcon involves “training a model as to parameters of a good wafer via optical viewing of multiple known wafers” as required to infringe the training element of claim 3. To show that the Falcon infringed claim 1, Rudolph must merely show that the Falcon is capable of inputting a plurality of known good quality wafers during training. *See Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1204 (Fed Cir. 2010) (“[T]o infringe a claim that recites capability and not actual operation, an accused device need only be capable of operating in the described mode. Thus, depending on the claims, an accused device may be found to infringe if it is reasonably capable of satisfying the claim limitations, even though it may also be capable of noninfringing modes of operation.” (internal citation and quotation marks omitted)). Claim 3, however, requires Rudolph to show that the Falcon has in fact trained a model through the viewing of multiple known wafers, not that it is merely capable of such an action. (*See* Pls.’ Mem. in Supp. of Mot. for Summ. J. at 27.) The Court previously defined the term “training” to mean “examining wafers to develop a model of a good quality wafer.” (*Markman* Order at 20.) In arriving at this construction, the Court noted that “the step in which the model is used to inspect die to

⁷ In deciding the parties’ motions for summary judgment, the Court has considered the expert report of Mundy because, as explained more fully below, it finds that the expert report is admissible. The Court also considers the expert report of Mellor because, even if that report was inadmissible, reliance on the report does not alter the Court’s summary judgment analysis.

locate defects is a step separate from training.” (*Id.*) Because Camtek did not appeal the construction of training, and the Federal Circuit did not alter the construction on appeal, the previous construction of training is controlling for purposes of this motion.

1. Claim 1

The Falcon is intended “to help companies decide which die should continue along the process of becoming chips for consumer use and which die need to be thrown away.” (First Decl. of John Mellor ¶ 3, July 2, 2012, Docket No. 826.) To accomplish this purpose, the Falcon performs several subroutines; the first involves using a single wafer to create a reference die. (First Mellor Decl. ¶ 3; First Stacy Decl., Ex. E at CAM000053-55.) After creating the reference die, the Falcon uses it to identify the locations of the die on the wafer and create a wafer map, which enables the Falcon to move from die to die during inspection of die on a wafer of unknown quality. (First Mellor Decl. ¶¶ 9-10; First Stacy Decl., Ex. E at CAM000053-55.) The Falcon then cleans the reference die to produce a golden die using a number of cleaning die that come from the same wafer. (First Mellor Decl. ¶¶ 3, 12; First Stacy Decl., Ex. E at CAM000056-57.) The golden die is used to train the Falcon which die are acceptable when it examines wafers containing dies of unknown quality. (First Mellor Decl. ¶ 3; First Stacy Decl., Ex. E at CAM000049.) Specifically, the Falcon “uses inspection parameters to determine how far the individual die can deviate from the golden die.” (First Mellor Decl. ¶ 3; First Stacy Decl., Ex. E at CAM000059-86, CAM000114-139; Thirty-Second Lee Decl, Ex. G at 35-36.) Therefore, when inspecting an unknown die

the Falcon does not actually compare the unknown die to the golden die, but compares it to the “inspection parameters to decide whether the [die] under test is close enough to the ideal die to be considered good or not.” (Thirty-Second Lee Decl., Ex. F at 53:6-17.) The Falcon also typically uses the wafer map when actually inspecting a wafer with die of unknown quality. (Thirty Second Lee Decl., Ex. F at 55:14-23, 56:22-24.)

On the Falcon, the processes of creating the reference die, generating the wafer map, cleaning the reference die to produce a golden die, and creating the inspection parameters that define an acceptable die can involve use of more than one physically discrete wafer (although only individual die on those discrete wafers may be used at any particular step). (Thirty-Second Lee Decl., Ex. C at 16-17 (“For example, a first sample wafer might have a first abnormality type that has been predetermined to not be a defect. This first sample wafer would be used to train the machine so that it does not erroneously identify the first abnormality type to be a defect. A second sample wafer might have a second abnormality type that has been predetermine[d] to not be a defect. This second sample wafer would be used to train the machine so that it does not erroneously identify the second abnormality type to be a defect.”); *id.*, Ex. F at 170:10-17 (during deposition of Camtek’s expert, Question: “So is it true that the Falcon machine is configured so that one wafer can be used to make a golden die, and another, different wafer can be used to adjust the minimum and maximum parameters?” Answer: “A die from one wafer can be used to make the golden die, and a die from a second wafer can be used to adjust min and max, which are inspection parameters, yes.”); *see also id.*, Ex. F at 116:21-24 (noting that

the Falcon uses wafer maps created from a prior wafer when inspecting other dies); *id.*, Ex F at 170:16-171:4.)

Camtek does not dispute that the Falcon is capable of undertaking the steps described above by using multiple, physically discrete wafers, as opposed to merely using multiple individual die found on a single wafer. Indeed, Camtek's own expert testified that the Falcon is capable of using multiple discrete wafers at these various steps. But Camtek argues that all of these steps do not constitute "training." Instead, Camtek argues that training is completed as soon as a golden die is formulated and that training means "examining wafers to develop a model of a good quality wafer" which Camtek interprets as "a collection of pixels representing a perfect wafer." (*See, e.g.*, Def.'s Mem. in Opp'n to Mot. for Summ. J. at 21-22.)

But Camtek's construction is contrary to the binding construction of the term "training" adopted by the Court in 2008. The Court construed training to mean "[e]xamining wafers to develop a model of a good quality wafer." (*Markman* Order at 20.) In adopting this construction, the Court rejected Rudolph's construction which incorporated "telling the system what a 'good die' comprises, and viewing good die to form a model based on common characteristics, elements and ranges. The model is then used to inspect die to locate defects." (*Id.* at 19-20 (internal citation omitted).) The only portion of Rudolph's description that the Court specifically excluded however, was "Plaintiffs[]" reliance on the step in which the model is used to inspect die to locate defects" because that "is a step separate from training, and need not be used to define training." (*Id.* at 20.) But the Court did not reject Rudolph's description that training

incorporated “telling the system what a ‘good die’ comprises, and viewing good die to form a model based on common characteristics, elements, and ranges.” (*Id.*) Notably, the Court did not construe training to involve development of a model of an “ideal” quality wafer. Instead, the Court concluded that a model wafer is one “with all of the necessary characteristics to inspect an unknown quality wafer.” (Mem. of Law & Order at 8.); *see also August Tech. Corp.*, 655 F.3d at 1283 (noting on appeal that “Claim 1 requires ‘visual inputting a plurality of known good quality wafers during training’ to teach the system a standard for detecting defects. The district court referred to this ‘plurality of known good quality wafers’ limitation as the multiple wafer limitation. **This limitation requires multiple good wafers to be used to train the system – so the inspection device will know a flawed wafer when it sees one.**” (emphasis added)).

Thus, to develop a model of a good quality wafer that can be used to conduct die inspection requires more than the creation of the golden die, because, as Camtek’s own expert testified, the Falcon inspects unknown die and compares them to the inspection parameters, not the golden die itself. Therefore, the Falcon would not have finished training – sufficient to have arrived at “the definition of a good die” or one “with all of the necessary characteristics to inspect an unknown quality wafer” if it stopped with the creation of the golden die. (*See* Thirty-Second Lee Decl., Ex. A at 12:63-13:7 (explaining that “[a] good die is defined as a die that does not have defects but may very [w]ell and is actually likely to have process variations in it; however all of these process variations have been deemed not to be defects and rather to be acceptable variations”).) The process of creating inspection parameters is thus integral to creating a model of a

good quality wafer, because the process identifies acceptable variations that will be allowed during inspection. Because the Falcon is capable of using multiple, physically discrete wafers to create the inspection parameters, it infringes claim 1, and the Court will grant Rudolph's motion for summary judgment with respect to that claim.⁸

2. Claim 3

With respect to the training element of claim 3, Rudolph is required to show direct infringement, and "must either point to specific instances of direct infringement or show that the accused device necessarily infringes the patent in suit." *ACCO Brands, Inc. v. ABA Locks Mfrs. Co.*, 501 F.3d 1307, 1313 (Fed. Cir. 2007). Circumstantial evidence can be used to show specific instances of direct infringement. *Fuji Photo Film Co. v. Jazz Photo Corp.*, 394 F.3d 1368, 1374 (Fed. Cir. 2005). Rudolph concedes that the Falcon **can** be operated in a non-infringing manner with respect to the training element of claim 3 (training with only a single discrete wafer), and thus must show that Camtek actually operated, or instructed that the Falcon to be operated in an infringing manner.

⁸ Camtek again repeats its argument based on its erroneous interpretation of the Federal Circuit's opinion that during training the Falcon inspects only individual die on wafers and never examines entire wafers. (*See, e.g.*, Def.'s Mem. in Opp'n to Mot. for Summ. J. at 23.) As explained above in the context of Camtek's request for claim construction, that the Falcon inspects individual die is irrelevant. What matters for the purposes of the training element is that the Falcon examines aspects of more than one physically discrete wafer, regardless of whether that aspect is only an individual die.

In support of its motion for summary judgment, Rudolph offers, among other evidence, a declaration from Darren James, a former Camtek employee. (*See* Decl. of Darren James ¶ 2, July 2, 2012, Docket No. 837.)⁹ James contends that

As a Camtek employee, I personally operated the Falcon machine and worked extensively with Camtek's customers in training the Falcon on various wafer products and helping them to find solutions to difficult inspection problems. During my employment at Camtek, I trained the Falcon in the U.S. using multiple whole wafers. In particular, I used multiple wafers in the training process which included the steps of creating a wafer map, a golden die model, and the model parameters such as minimums and maximums.

(*Id.* ¶ 3.) James also declares that he trained specific United States-based Camtek customers – including Cypress Semiconductor, Delphi, and Micro Systems Engineering – to use the Falcon machine “using multiple discrete wafers.” (*Id.* ¶¶ 5, 8, 10-11, 13, 20.) Specifically, James indicated that he “trained the Falcon systems that were installed at Cypress Semiconductor after November 30, 2004.” (*Id.* ¶ 5.) Plaintiffs’ expert also

⁹ As an initial matter, Camtek argues that the declaration from Darren James was an improper submission under the Court’s scheduling order because it constitutes new fact discovery. (*See* Second Decl. of Mark Smith, July 23, 2012, Docket No. 867.) Camtek brought a motion seeking to “enforce the Scheduling Order” and “block Rudolph from relying on Darren James, including Mr. James’ declaration.” (Mot. to Enforce the Court’s Scheduling Order at 1, July 11, 2012, Docket No. 858.) The Magistrate Judge has since denied the motion. (Order at 1, Jan. 24, 2013, Docket No. 959.) The Magistrate Judge concluded that Rudolph had “not engaged in new fact discovery in violation of the Court’s scheduling order” and also noted that “there is no unfair surprise to Camtek, given that: Mr. James was identified by Camtek seven years ago as an employee who provided customer and sales support, Plaintiffs identified Mr. James as a witness in supplemental disclosures served May 9, 2012, and Plaintiffs’ expert Dr. Mundy relied on facts provided by Mr. James in his expert report served on May 15, 2012.” (*Id.* at 1-2.) Accordingly, the Court may properly rely upon the James Declaration in resolving the present motions. The Magistrate Judge also, however, ordered that James appear for a deposition within thirty days of the date of the order. (*Id.* at 2.) The parties have provided no further communication to the Court regarding the deposition of James or what impact it might have had on the present motions.

inspected a Falcon at a Camtek customer's facility in Arizona, interviewed James, spoke with a Camtek customer that had been trained on the Falcon by Camtek, and interviewed a Rudolph employee regarding industry training practices, and based on the information gathered, concluded that Camtek trained its customers to use multiple, physically discrete wafers when using the Falcon's training function. (*See* Thirty-Second Lee Decl., Ex. C at 31-34.)

Surprisingly, Camtek has provided no evidence from other Camtek employees or customers indicating that they did not operate the Falcon in an infringing manner during the relevant time period to refute James' declaration. Nor has Camtek provided any evidence to demonstrate that the customers identified by James were not, in fact, trained on Falcon machines to use multiple, physically discrete wafers during the relevant time period. Indeed, Camtek's expert testified that he did not "have any specific knowledge" of "whether or not anybody from Camtek has actually ever trained a Falcon system using multiple wafers." (Thirty-Second Lee Decl., Ex. F at 132:23-133:2.) He also testified that he had never asked anyone at Camtek whether they had ever performed the steps of claim 3. (*Id.*, Ex. F at 129:25-130:1.) Instead, Camtek generally attacks James' credibility as a former Camtek employee who now works for Rudolph, to suggest that his testimony might not be accurate. (Def.'s Mem. in Opp'n to Mot. for Summ. J. at 25-27.)¹⁰ The only **evidence** actually presented by Camtek in support of its position that the

¹⁰ Camtek also argues that James' declaration is insufficiently specific to show that the Falcon was operated in an infringing manner after November 30, 2004 – the date claim 3 of the '6,298 patent was issued. (Def.'s Mem. in Opp'n to Mot. for Summ. J. at 24.) But James' (Footnote continued on next page.)

Falcon did not practice claim 3 is a page from the Falcon's user guide which teaches customers setup using a single wafer. (*See* First Stacy Decl., Ex. E at CAM000059.) But at trial, Camtek's head of customer support testified that during personal training of customers on the Falcon machine Camtek employee's "don't use the user manuals themselves. User manuals are provided to customers when they first buy a machine if they ask for them, but during the training, we use different materials." (Thirty-Fourth Decl. of Joseph E. Lee, Aug. 6, 2012, Docket No. 902, Ex. N at 1431:8-17.) Camtek also presented testimony at trial that the user manual was not

necessarily on how to work with the Falcon. Again, we sent engineers to train the customers on how to work with the machine. When you buy a \$500,000 machine, you don't read the manual. You expect a person to sit with you and tell you exactly how the machine works. It is not a VCR. It's a very complicated machine.

(*Id.*, Ex. N at 1688:7-14.) Therefore, Camtek's identification of a single page in the Falcon manual that showed customers how to run set up with one wafer – which was not used by Camtek employees when actually training customers on the machine – is insufficient to create a genuine issue of material fact with respect to James' specific declaration that he showed Camtek customers how to execute the training element of the machine using multiple, physically discrete wafers. Furthermore, the mere attack on James' credibility, in the absence of other evidence demonstrating that his testimony is

(Footnote continued.)

declaration specifically states that he "trained the Falcon systems that were installed at Cypress Semiconductor after November 30, 2004," and did so using multiple discrete wafers. (James Decl. ¶ 5.) Accordingly, Camtek's argument that James' declaration lacks the requisite specificity is incorrect.

unreliable or incorrect, is insufficient to survive summary judgment. *See Thompson v. Hubbard*, 257 F.3d 896, 899 (8th Cir. 2001) (noting that to defeat summary judgment a party must “present enough evidence to permit a reasonable jury” to find in its favor, and that a party “may not stave off summary judgment armed with only the hope that the jury might disbelieve witnesses’ testimony” (internal quotation marks omitted)). Because Camtek has presented no evidence to refute James’ testimony or the opinion of Plaintiffs’ expert upon which a reasonable jury could conclude that Camtek did not train its customers to use the Falcon in a manner that infringed claim 3, the Court will grant Rudolph’s motion for summary judgment of infringement with respect to this claim.

IV. MOTIONS TO EXCLUDE EXPERT TESTIMONY

A. Standard of Review

The admissibility of expert testimony is a question of law for the court, governed by Fed. R. Evid. 702 and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993). The proponent of expert testimony bears the burden of establishing its admissibility. *Wagner v. Heston Corp.*, 450 F.3d 756, 758 (8th Cir. 2006).

Federal Rule of Evidence 702 provides that:

- A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:
- (a) the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
 - (b) the testimony is based on sufficient facts or data;
 - (c) the testimony is the product of reliable principles and methods; and
 - (d) the expert has reliably applied the principles and methods to the facts of the case.

Fed. R. Evid. 702. “An expert may base an opinion on facts or data in the case that the expert has been made aware of or personally observed. If experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion on the subject, they need not be admissible for the opinion to be admitted.” Fed. R. Evid. 703. If the facts or data used by the expert are, however, inadmissible “the proponent of the opinion may disclose them to the jury only if their probative value in helping the jury evaluate the opinion substantially outweighs their prejudicial effect.” *Id.*

In determining whether an expert’s testimony is admissible, the Court considers (1) whether the proposed expert is qualified to assist the trier of fact; (2) whether the testimony would be useful to the trier of fact in deciding the ultimate issues of fact; and (3) whether the proposed evidence is reliable or trustworthy in an evidentiary sense. *Sappington v. Skyjack, Inc.*, 512 F.3d 440, 448 (8th Cir. 2008). “Expert testimony is inadmissible if it is speculative, unsupported by sufficient facts, or contrary to the facts of the case.” *Marmo v. Tyson Fresh Meats, Inc.*, 457 F.3d 748, 757 (8th Cir. 2006). To satisfy the reliability requirement, the proponent of the expert testimony must show “both that the expert is qualified to render the opinion and that the methodology underlying his conclusions is scientifically valid.” *Id.* at 757-58.

Rule 702 favors admission of testimony and “the exclusion of an expert’s opinion is proper only if it is so fundamentally unsupported that it can offer no assistance to the jury.” *Wood v. Minn. Mining & Mfg Co.*, 112 F.3d 306, 309 (8th Cir. 1997) (internal quotations omitted); *see also* Fed. R. Evid. 702 advisory committee’s note (explaining

that exclusion of expert testimony under *Daubert* “is the exception rather than the rule”). Moreover, “[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.” *Daubert*, 509 U.S. at 596.

Like all testimony, expert testimony is also subject to the relevancy requirements of Fed. R. Evid. 401, 402, and 403. To be admissible testimony must be “directly relevant” and “logically advance[] a material aspect of the proposing party’s case.” *Cooper v. Brown*, 510 F.3d 870, 942 (9th Cir. 2007).

B. Camtek’s Motion to Exclude McCloskey

Camtek brings a motion to strike the May 15, 2012 expert report of McCloskey and to exclude the testimony of McCloskey relating to offers for sale and injunctive relief. (Mot. to Exclude Expert Testimony & Report of Frances McCloskey, July 2, 2012, Docket No. 818.) Although the Court has determined that summary judgment in Rudolph’s favor on infringement is appropriate, it must still decide Camtek’s motion as McCloskey’s expert report and testimony will be relevant to the remedies stage of these proceedings that will follow issuance of this Order.

Camtek argues that McCloskey’s report and testimony must be excluded for two primary reasons. First, Camtek argues that McCloskey’s opinion on injunctive relief is based on an “incorrect understanding of what constitutes an ‘offer for sale’ and whether such offers constitute patent infringement under United States law.” (Mem. in Supp. of Mot. to Exclude Expert Testimony & Report of Frances McCloskey at 5, July 2, 2012,

Docket No. 821.) Second, Camtek argues that McCloskey's testimony should be excluded because "she bases her entire opinion on off-the-record conversations with Rudolph employees—making no effort to confirm the truth of those statements." (*Id.*)

1. McCloskey's 2012 Report and Testimony

Rudolph did not offer expert testimony in support of its request for injunctive relief at the initial trial. Rudolph did however offer a report and testimony from McCloskey at the first trial regarding its entitlement to lost profits as a result of the infringing sales of the Falcon. (Tr. at 1176-77, Mar. 5, 2009, Docket No. 513.)¹¹

McCloskey's 2012 opinion suggests that Rudolph has been irreparably harmed by Camtek's communicating with third parties in the United States for the purpose of offering to sell Falcon systems for use outside the United States. (Third Decl. of Sarah Guske, Ex. A at 4, July 2, 2012, Docket No. 822.) Specifically, the opinion contained in McCloskey's report is that:

Camtek's offers to sell and actual sales of Falcon inspection systems to entities in the United States harms Rudolph because they diminish the ability of Rudolph to sell its competing inspection systems to those parties and in the market as a whole. Rudolph and Camtek are direct competitors in the U.S. and worldwide in the market for wafer inspection systems. Camtek's U.S. communications generate interest in the infringing Falcon product to the detriment of Rudolph, a U.S.-based company who makes its competing products in the U.S.

(*Id.*)

¹¹ McCloskey issued expert reports on June 19, 2007, and October 20, 2008, regarding damages based on lost profits and reasonable royalties that Rudolph was entitled to receive as a result of the infringing actions of Camtek. (Third Decl. of Sarah Guske, Ex. A at 2, July 2, 2012, Docket No. 822.)

At her 2012 deposition, McCloskey testified that she was not entirely certain what the requirements for an offer for sale were, but that generally an offer for sale is “[a] communication of the features and pricing and/or details of an infringing device or product.” (Third Guske Decl., Ex. B at 17:25-19:24.) When pressed on whether she considered an advertisement to be an offer for sale, McCloskey responded that “[w]ell, as a layperson . . . I would say an advertisement is an offer to sell. I don’t know what the Federal Circuit has to say about an advertisement. They may require that it be a more detailed offer.” (*Id.*, Ex. B at 19:18-24.) McCloskey also testified that in forming her opinion, she relied on the assumption that an offer for sale in the United States, regardless of where the product was shipped, constitutes infringement under United States law. (*Id.*, Ex. B at 8:3-11.)

2. Offers for Sale/Infringing Offers for Sale

Under patent law, infringing conduct includes an offer to sell an infringing product within the United States. *See* 35 U.S.C. § 271(a). Whether an activity constitutes an “offer to sell” is to be interpreted according to its ordinary meaning in contract law.” *Rotec Indus., Inc. v. Mitsubishi Corp.*, 215 F.3d 1246, 1255 (Fed. Cir. 2000). An offer is a communication “which the other party could make into a binding contract by simple acceptance.” *Grp. One, Ltd. v. Hallmark Cards, Inc.*, 254 F.3d 1041, 1048 (Fed. Cir. 2001). “Based on this principle, courts often conclude that advertisements and promotional materials do not constitute offers.” *Ductcap Prods., Inc. v. J&S Fabrication, Inc.*, Civ. No. 09-1179, 2009 WL 3242022, at *3 (D. Minn. Oct. 2, 2009). Additionally,

an offer for sale does not constitute infringement where the location of the sale is outside of the United States. *See Transocean Offshore Deepwater Drilling, Inc.*, 617 F.3d at 1309.

3. Admissibility of McCloskey's Testimony¹²

Experts are not allowed to testify as to legal matters. *See S. Pine Helicopters, Inc. v. Phoenix Aviation Managers, Inc.*, 320 F.3d 838, 841 (8th Cir. 2003) (“[E]xpert testimony on legal matters is not admissible.”). To the extent, therefore that McCloskey's testimony would be for the purpose of telling the Court what offers constituted infringement, it would be improper. But that does not appear to be the purpose or the basis of McCloskey's testimony. Instead, McCloskey's opinion is based on explaining the types and quantities of harm that occur to Rudolph's business when Camtek undertakes certain actions. McCloskey will provide the Court with information on the financial and competitive nature of the very niche market for semiconductor

¹² Rudolph argues as a preliminary matter that Camtek should not be allowed to move for the exclusion of McCloskey's testimony, because it already tried to do so before the Magistrate Judge in its motion to bifurcate. (Response to Mot. to Exclude the Report & Testimony of McCloskey at 6-7, July 23, 2012, Docket No. 870.) Camtek did argue to the Magistrate Judge that McCloskey's testimony should be excluded, but that argument was made in the context of a discussion about damages and an assertion that McCloskey's 2012 report violated the Court's scheduling order. (Order at 2-3, June 26, 2012, Docket No. 816.) Because the Magistrate Judge determined that damages were not to be re-tried on remand, he never reached the question of the admissibility of McCloskey's opinion as to damages. (*Id.* at 3.) Instead, the Magistrate Judge determined that expert reports on injunctive relief were permissible. (*Id.*) Camtek has appealed the Magistrate Judge's order on this issue, and that appeal is currently pending before the Court. Although it would have been desirable for Camtek to present its entire argument regarding the exclusion of McCloskey's testimony in the same motion, it does not appear that Camtek is currently raising an issue which was already decided against it. Instead, Camtek is specifically challenging the admissibility of McCloskey's testimony as it relates to injunctive relief. Accordingly, the Court finds it proper to consider Camtek's motion to exclude McCloskey.

inspection systems. If McCloskey attempts to testify that certain actions do constitute infringement, Camtek is free to object at that time. This does not however, indicate that McCloskey's testimony is inadmissible.

Additionally, to the extent Camtek argues that McCloskey's testimony should be excluded because she relies on unverified statements of Rudolph employees and hearsay, this does not provide grounds for excluding McCloskey's testimony. First, it is appropriate for an expert to "express an opinion that is based on facts that the expert assumes, but does not know, to be true." *Williams v. Illinois*, 132 S. Ct. 2221, 2228 (2012). Therefore, even if McCloskey relies solely on statements from Rudolph employees in forming her opinion of irreparable harm (which does not appear to be the case), this goes to the weight, not the admissibility of her testimony. McCloskey can assume, for purposes of her testimony, that Camtek took certain actions, and opine about the harm that has resulted to Rudolph as a result of those actions. It will be for the factfinder to determine whether those actions occurred, and for Court to determine whether those actions constitute infringement and therefore must be enjoined. Accordingly, the Court will deny Camtek's motion to exclude the expert report and testimony of McCloskey.

C. Camtek's Motion to Exclude Mundy

Camtek also brings a motion to exclude the expert report of Mundy. Because the Court has relied upon the Mundy expert report in granting summary judgment of infringement in Rudolph's favor, it must satisfy itself at this stage that the expert report

was properly admissible. Camtek makes two main arguments in support of its motion to exclude. First, Camtek contends that Mundy has misconstrued the claims and therefore his testimony about the operation of the Falcon is contrary to law. Second, Camtek argues that Mundy's opinions are based on speculations about how Camtek trains and that Mundy has an erroneous understanding of what constitutes infringing behavior, and therefore his opinion as to how Camtek trained purchasers on the Falcon is inadmissible. Camtek does not dispute that Mundy is well qualified to testify and that he testified as to the functioning of the Falcon and other matters at the first trial. The Court finds that none of these reasons justify exclusion of Mundy's report.

Camtek's first argument does not provide a basis to exclude Mundy. Camtek argues that Mundy has misconstrued the claims because Mundy contends in his deposition testimony that comparing a model to an unknown quality wafer does not mean the model must be compared to the entire wafer. But this issue goes to the microprocessor/inspection element which is not properly before the Court on remand. Therefore, even if Mundy's understanding of the claims with respect to that element was erroneous, this would not serve as a basis for excluding the portion of the report relied upon by the Court in granting summary judgment. Camtek also argues that Mundy has misconstrued the term "model" in rendering his opinion. Although Mundy's interpretation of "model" is consistent with the law of the case, even if it were not, this would not provide a basis for excluding Mundy's report because claim construction is an issue for the Court. Therefore, Mundy is still allowed to present an opinion as to how the Falcon operates and whether it infringes.

Camtek's second argument also does not provide a basis to exclude Mundy. Camtek argues that Mundy has based his opinion about how Camtek trains purely on speculation. Mundy's report does not reflect this characterization. (*See* Fourth Decl. of Sarah Guske, Ex. B, July 2, 2012, Docket No. 830; Thirty-Second Lee Decl., Ex. C.) In his lengthy reports, Mundy references numerous Camtek documents, testimony of other experts, his own expertise in the field, testimony of users of the Falcon, and the like as the basis for formulating his opinions. Accordingly, the Court will deny Camtek's motion to exclude the expert report of Mundy.

D. Rudolph's Motion to Exclude Mellor

Finally, Rudolph brings a motion to strike the June 1, 2012 expert report of Mellor and exclude his testimony about infringement. Because the Court has concluded that summary judgment in Rudolph's favor on infringement is appropriate, even in light of the expert report of Mellor, the Court need not rule on the admissibility of the report, and will deny Rudolph's motion to exclude as moot.

ORDER

Based on the foregoing, and all the files, records, and proceedings herein, **IT IS HEREBY ORDERED** that:

1. Defendant's Motion for Claim Construction [Docket No. 823] is **DENIED**.
2. Defendant's Motion for Summary Judgment of Non-Infringement [Docket No. 823] is **DENIED**.

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3. Plaintiffs' Motion for Summary Judgment of Infringement [Docket No. 832] is **GRANTED**.

4. Defendant's Motion to Exclude Expert Testimony and Report of Frances McCloskey [Docket No. 818] is **DENIED**.

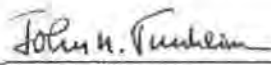
5. Defendant's Motion to Exclude Expert Testimony and Report of Joseph Mundy [Docket No. 828] is **DENIED**.

6. Plaintiffs' Motion to Exclude Expert Testimony and Report of John Phillip Mellor [Docket No. 840] is **DENIED as moot**.

7. After the Court issues an order ruling on Defendant's objections [Docket No. 855] to the Magistrate Judge's order regarding remedies [Docket No. 816] it will schedule a status conference with the parties to ascertain the most appropriate manner in which to proceed with respect to the remedies phase of this matter.

8. The parties are to show cause on or before twenty-one (21) days from the date of this Order why the Court should not unseal the Order, and to specify any portion of the Order warranting redaction.

DATED: March 31, 2014
at Minneapolis, Minnesota.



JOHN R. TUNHEIM
United States District Judge

**UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

AUGUST TECHNOLOGY CORPORATION
and RUDOLPH TECHNOLOGIES, INC.,

Civil No. 05-1396 (JRT/FLN)

Plaintiffs,

ORDER

v.

CAMTEK, LTD,

Defendant.

Thomas R. Johnson, William D. Schultz, Daniel W. McDonald, Heather J. Kliebenstein, Joseph E. Lee, and Rachel C. Hughey, **MERCHANT & GOULD PC**, 80 South Eighth Street, Suite 3200, Minneapolis, MN 55402; and Ernest W. Grumbles, III, **ADAMS MONAHAN LLP**, 287 East Sixth Street, Suite 140, Saint Paul, MN 55101, for plaintiff August Technology Corporation.

Daniel W. McDonald, **MERCHANT & GOULD PC**, 80 South Eighth Street, Suite 3200, Minneapolis, MN 55402, for plaintiff Rudolph Technologies, Inc.

Ann N. Cathcart Chaplin and Michael E. Florey, **FISH & RICHARDSON PC**, 60 South Sixth Street, Suite 3200, Minneapolis, MN 55402; David R. Francescani, Edmond R. Bannon, Michael F. Autuoro, **FISH & RICHARDSON PC**, 153 East Fifty-Third Street, Fifty-Second Floor, New York, NY 10022; Sarah J. Guske and Wayne O. Stacy, **COOLEY LLP**, 380 Interlocken Crescent, Suite 900, Broomfield, CO 80021; Thomas J. Friel, Jr., **COOLEY LLP**, 101 California Street, Fifth Floor, San Francisco, CA 94111; Mark T. Smith, **COOLEY LLP**, 3175 Hanover Street, Palo Alto, CA 93404; Vincent J. Fahnlander and William F. Mohrman, **MOHRMAN & KAARDAL**, 33 South Sixth Street, Suite 4100, Minneapolis, MN 55402; and John D. Garretson, for defendant.

The parties in the above captioned matter have filed two motions following the Court's March 31 Order. (See Mot. for New Proceedings & Jury Trial, Apr. 18, 2014,

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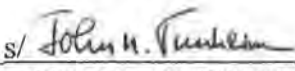
Docket No. 966; Mot. for Permanent Inj. & Final J., May 19, 2014, Docket No. 981.) In light of the fact that these recent filings do not appear to conform to the scheduling order in place or the Local Rules, to aid in the just and speedy management and resolution of this case **IT IS HEREBY ORDERED** that:

1. The parties shall follow the dispositive motion briefing schedule with respect to Plaintiffs' Motion for Permanent Injunction and Final Judgment [Docket No. 981].

2. With the exception of the briefing allowed regarding Docket No. 981, the parties are prohibited from filing further documents or motions in this case without receiving prior permission from the Court, until further order of the Court.

3. Motions or materials filed without prior permission of the Court will be stricken from the docket and will not be considered by the Court.

DATED: May 27, 2014
at Minneapolis, Minnesota.



JOHN R. TUNHEIM
United States District Judge

Covington, Caroline

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U.S. District Court

U.S. District of Minnesota

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Case Number: 0:05-cv-01396-JRT-FLN

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Document Number: 1003(No document attached)

Docket Text:

TEXT ONLY ENTRY: NOTICE to Attorney: Camtek Ltd's request to file a motion to strike Rudolph Technologies, Inc's Reply Brief is DENIED. (HAZ)

0:05-cv-01396-JRT-FLN Notice has been electronically mailed to:

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**UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

AUGUST TECHNOLOGY
CORPORATION and RUDOLPH
TECHNOLOGIES, INC.,

Civil No. 05-1396 (JRT/FLN)

Plaintiffs,

ORDER

v.

CAMTEK, LTD,

Defendant.

Thomas R. Johnson, William D. Schultz, Daniel W. McDonald, Heather J. Kliebenstein, Joseph E. Lee, and Rachel C. Hughey, **MERCHANT & GOULD PC**, 80 South Eighth Street, Suite 3200, Minneapolis, MN 55402; and Ernest W. Grumbles, III, **ADAMS MONAHAN LLP**, 287 East Sixth Street, Suite 140, Saint Paul, MN 55101, for plaintiff August Technology Corporation.

Daniel W. McDonald, **MERCHANT & GOULD PC**, 80 South Eighth Street, Suite 3200, Minneapolis, MN 55402, for plaintiff Rudolph Technologies, Inc.

Ann N. Cathcart Chaplin and Michael E. Florey, **FISH & RICHARDSON PC**, 60 South Sixth Street, Suite 3200, Minneapolis, MN 55402; David R. Francescani, Edmond R. Bannon, Michael F. Autuoro, **FISH & RICHARDSON PC**, 153 East Fifty-Third Street, Fifty-Second Floor, New York, NY 10022; Sarah J. Guske and Wayne O. Stacy, **COOLEY LLP**, 380 Interlocken Crescent, Suite 900, Broomfield, CO 80021; Thomas J. Friel, Jr., **COOLEY LLP**, 101 California Street, Fifth Floor, San Francisco, CA 94111; Mark T. Smith, **COOLEY LLP**, 3175 Hanover Street, Palo Alto, CA 93404; Vincent J. Fahnlander and William F. Mohrman, **MOHRMAN & KAARDAL**, 33 South Sixth Street, Suite 4100, Minneapolis, MN 55402; and John D. Garretson, for defendant.

Plaintiffs August Technology Corporation and Rudolph Technologies, Inc. (collectively “Rudolph”) brought this patent infringement action against Defendant Camtek, Ltd. (“Camtek”) in 2005, alleging infringement of claims 1 through 5 of United States Patent No. 6,826,298 (the “‘6,298 patent”). In 2009, a jury found that Camtek had infringed claims 1 and 3 of the ‘6,298 patent and awarded Rudolph \$6,782,490 in damages. (Special Verdict Form at 1-4, 7, Mar. 5, 2009, Docket No. 466.) On appeal, the Federal Circuit reversed the Court’s claim construction of the term “wafer” as it was used in the ‘6,298 patent. *August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1286 (Fed. Cir. 2011). The Federal Circuit declined to reach Camtek’s arguments regarding the award of damages, *id.* at 1290-91, and remanded “for a limited trial on infringement with respect to this claim element,” *id.* at 1286.

On remand the parties filed cross motions for summary judgment on the issue of infringement. (*See* Mot. for Summ. J. of Non-Infringement, July 2, 2012, Docket No. 823; Mot. for Summ. J. of Infringement, July 2, 2012, Docket No. 832.) On March 31, 2014, the Court granted Rudolph’s motion for summary judgment, finding that no genuine issue of material fact remained regarding Camtek’s infringement of the ‘6,298 patent. (Mem. Op. & Order, Mar. 31, 2014, Docket No. 964.) Camtek has now filed a motion for a new trial to re-determine damages in light of the Court’s March 31, 2014 order. (Mot. for New Proceedings & Jury Trial, Apr. 18, 2014, Docket No. 966.)

Camtek had previously filed objections to an order of the Magistrate Judge denying a motion to bifurcate after determining that the jury’s original award of damages should be reinstated if Camtek was again found to infringe on remand. (Order, June 26,

2012, Docket No. 816; Objections, July 10, 2012, Docket No. 855.) Rudolph later filed objections to Camtek's submission of additional facts in support of Camtek's objections. (Objection, Aug. 20, 2012, Docket No. 915.) Those objections were pending before the Court when Camtek filed its motion for a new trial to re-determine damages in light of the Court's March 31, 2014 order. Because the motion raises issues identical to those addressed in the objections, but does so in light of new developments in the case, the Court concludes that consideration of the issues as raised in the motion – rather than the objections – is the most appropriate course of action at this stage of the case. Accordingly, the Court will deny the objections as moot, vacate the Magistrate Judge's order to the extent it made a determination on the propriety of a retrial on damages, and consider the issue of a new trial on damages in light of the Court's March 31 order and the parties' most recent submissions.

Based on the foregoing, and all the files, records, and proceedings herein, **IT IS HEREBY ORDERED** that:

1. Camtek's Objections [Docket No. 855] and Rudolph's Objections [Docket No. 915] are **DENIED as moot**.
2. The Order of the Magistrate Judge Dated June 26, 2012, is **VACATED**.
3. The Court will consider the issue of a new trial on damages in light of the parties' most recent submissions related to the motions pending at Docket Nos. 966 and 981.

DATED: September 5, 2014
at Minneapolis, Minnesota.

s/John R. Tunheim
JOHN R. TUNHEIM
United States District Judge

**UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

AUGUST TECHNOLOGY
CORPORATION and RUDOLPH
TECHNOLOGIES, INC.,

Civil No. 05-1396 (JRT/FLN)

Plaintiffs,

**MEMORANDUM OPINION
AND ORDER**

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Plaintiffs August Technology Corporation and Rudolph Technologies, Inc. brought this patent infringement action against Defendant Camtek, Ltd. ("Camtek") in 2005 alleging infringement of claims 1 through 5 of United States Patent No. 6,826,298 (the "6,298 patent"). In 2009, a jury found that Camtek had infringed claims 1 and 3,

and the Court entered judgment and a permanent injunction. In 2011, the Federal Circuit vacated the judgment and remanded for further proceedings with an amended claim construction. Applying the new claim construction, this Court entered summary judgment for Plaintiffs on the issue of infringement in March 2014.

The case is now before the Court on Camtek's motion for new proceedings and a jury trial to determine damages responsive to the revised claim construction, and Plaintiffs' motion for final judgment and a permanent injunction. Because no genuine issues of material fact remain for a jury to decide, and because recent Federal Circuit precedent affects the injunctive relief previously entered in this case, the Court will deny Camtek's motion and grant Rudolph Technologies, Inc.'s motion in part. The Court will also vacate the contempt order entered against Camtek [Docket No. 764], based on the Federal Circuit's decision in *Halo Electronics, Inc. v. Pulse Electronics, Inc.*, 769 F.3d 1371 (Fed. Cir. 2014).

BACKGROUND¹

Plaintiff August Technology Corporation developed the inventions that are the subject of the '6,298 patent. (Thirty-Second Decl. of Joseph E. Lee, Ex. A, July 2, 2012, Docket No. 835.) Rudolph Technologies, Inc. purchased August Technology in 2006, and Rudolph and August Technology (collectively, "Rudolph") are now co-owners of the

¹ A more detailed recitation of the facts can be found in the Court's previous orders. See *August Tech. Corp. v. Camtek, Ltd.*, No. 05-1396, 2012 WL 3568823, at *1-2 (D. Minn. Aug. 17, 2012); (Mem. Op. & Order ("2014 Summary Judgment Order") at 3-15, Mar. 31, 2014, Docket No. 964.).

'6,298 patent. Camtek directly competes with Rudolph in the market for automated wafer inspection systems, particularly through its "Falcon" device. (Mem. Op. & Order ("*Markman* Order") at 2, Jan. 3, 2008, Docket No. 268; Compl. ¶¶ 3-5, July 14, 2005, Docket No. 1.) In 2005, Rudolph filed this action against Camtek for infringing the '6,298 patent.

I. THE '6,298 PATENT

The '6,298 patent contains five claims. Claims 1 and 3 are the most relevant to the issue of infringement.

A. Claim 1

Claim one of the '6,298 patent recites:

An automated system for inspecting a substrate such as a wafer in any form including whole patterned wafers, sawn wafers, broken wafers, and wafers of any kind on film frames, dies, die in gel paks, die in waffle paks, multi-chip modules often called MCMs, JEDEC trays, Auer boats, and other wafer and die package configurations for defects, the system comprising:

- a wafer test plate;
- a wafer provider for providing a wafer to the test plate;
- a visual inspection device for visual inputting of a plurality of known good quality wafers during training and for visual inspection of other unknown quality wafers during inspection;
- at least one of a brightfield illuminator positioned approximately above, a darkfield illuminator positioned approximately above, and a darkfield laser positioned approximately about the periphery of the wafer test plate, all of which are for providing illumination to the unknown quality wafers during inspection and at least one of which strobes to provide short pulses of light during movement of a wafer under inspection based on a velocity of the wafer; and

a microprocessor having processing and memory capabilities for developing a model of good quality wafer and comparing unknown quality wafers to the model.

(Compl., Ex. A 20:55-21:9.)

B. Claim 3

Claim three of the '6,298 patent recites:

An automated method of inspecting a semiconductor wafer in any form including whole patterned wafers, sawn wafers, broken wafers, and wafers of any kind of film frames, dies, die in gel paks, die in waffle paks, multi-chip modules often called MCMs, JEDEC trays, Auer boats, and other wafer and die package configurations for defects, the method comprising:

training a model as to parameters of a good wafer via optical viewing of multiple known good wafers;

illuminating unknown quality wafers using at least one of a brightfield illuminator positioned approximately above, a darkfield illuminator positioned approximately above, and a darkfield laser positioned approximately about the periphery of a wafer test plate on which the wafer is inspected, all of which are for providing illumination to the unknown quality wafers during inspection and at least one of which flashes on and off during movement of a wafer under inspection at a sequence correlating to a velocity of the wafer; and

inspecting unknown quality wafers using the model.

(*Id.*, Ex. A 21:17-22:15.)

II. PROCEDURAL HISTORY

A. Claim Construction and Trial

In a January 3, 2008 *Markman* order, the Court construed a number of terms in the '6,298 patent that are relevant to the current motions, including:

Wafer. The Court construed “wafer” to mean “[a] thin slice of semiconductor material with circuitry thereon that is ready for electrical testing, or any part thereof.” (*Markman* Order at 8, 11.)

Training. The Court construed training to mean “[e]xamining wafers to develop a model of a good quality wafer.” (*Id.* at 20.) In adopting this construction, the Court rejected Rudolph’s construction which incorporated “telling the system what a ‘good die’ comprises, and viewing good die to form a model based on common characteristics, elements, and ranges. The model is then used to inspect die to locate defects.” (*Id.* at 19-20 (internal citation omitted).) Instead, the Court found that “Plaintiffs[’] reliance on the step in which the model is used to inspect die to locate defects is a step separate from training, and need not be used to define training.” (*Id.* at 20.)

Based on the Court’s claim construction, after an eighteen-day trial, a jury returned a special verdict finding that Camtek and its Falcon device literally infringed both claims 1 and 3 of the ‘6,298 patent. (Special Verdict Form at 1-4, Mar. 5, 2009, Docket No. 466.) The jury found that Camtek’s infringement was not willful, and awarded \$6,782,490 in lost profits to Rudolph. (*Id.* at 6-7.)

The Court denied Camtek’s motion for judgment as a matter of law or a new trial on validity, infringement, and damages. (Mem. Op. & Order at 2, 8, 14-15, Aug. 25, 2009, Docket No. 545.) Specifically, the Court rejected Camtek’s argument that the Court had erred in instructing the jury with respect to the meaning of “on sale.” (*Id.* at 3-6.) The Court also determined that the jury verdict was not against the clear weight of the evidence with respect to the date of sale of the NSX-80 device. (*Id.* at 7-8.) Finally, the

Court granted Rudolph's motion to dismiss Camtek's inequitable conduct defense and counterclaim, which had previously been bifurcated from the original trial, because those theories of defense had been precluded by the jury verdict. (*Id.* at 2, 8-12.)

B. Appeal

Camtek appealed to the Federal Circuit, challenging the jury's damages award, the permanent injunction entered by the district court, the validity of the '6,298 patent itself, and two infringement issues (Thirty-Second Lee Decl., Ex. E.)² Camtek argued first that "the Falcon trains on only a single wafer, not multiple wafers," and second, that "the Falcon strobe[] [is] based on the position of the wafer, not the velocity of the wafer." (*Id.*, Ex. E at 5, 31, 43.) As to the single versus multiple wafer issue, Camtek argued that the district court had erred when it construed the term wafer as "a thin slice of semiconductor material with circuitry thereon that is ready for electrical testing, **or any part thereof.**" *August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1282 (Fed. Cir. 2011) (internal quotation marks omitted). Camtek argued that the Falcon only trains individual die, which can all be found on a single wafer. (Thirty-Second Lee Decl., Ex. E at 43-44.)

The Federal Circuit agreed with Camtek that the district court had erred in its construction of "wafer" and provided a new construction for the term "wafer":

The district court's construction is in error so far as it defines a wafer as any portion of a wafer having two or more dies. We construe a wafer as recited in the claims at issue as a thin, discrete slice of semiconductor material with circuitry thereon that is ready for electrical testing having one

² Page references to Exhibit E of the Thirty-Second Lee Declaration refer to the CM/ECF pagination.

or more dies. A plurality of wafers means more than one physically distinct wafer.

August Tech. Corp., 655 F.3d at 1286. Because it found that the district court had erred in its claim construction, the Federal Circuit “vacate[d] the district court’s judgment of infringement, its award of damages, and its grant of a permanent injunction, and remand[ed] for further proceedings consistent with [its] opinion.” *Id.* at 1281. The court remanded the case to the district court “for a limited trial on infringement,” *id.* at 1286, and advised the district court that if it found Camtek’s Falcon to infringe under the revised claim construction, it should take into account the effect of *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296 (Fed. Cir. 2010) (“*Transocean*”), when crafting an appropriate injunction, *August Tech.*, 655 F.3d at 1291.

C. Summary Judgment Order

On March 31, 2014, the Court granted summary judgment to Rudolph on the issue of infringement, using the Federal Circuit’s claim construction. (Mem. Op. & Order (“Summ. J. Order”), Mar. 31, 2014, Docket No. 964.) The Court determined that “no material issues of fact remain[ed] as to whether Camtek’s product was capable of practicing the infringing method and did, in fact, practice such a method.” (*Id.* at 2.) More specifically, “[b]ecause the Falcon is capable of using multiple, physically discrete wafers to create the inspection parameters [for die], it infringes claim 1” (*Id.* at 33.) The Court noted that claim 3 “requires Rudolph to show that the Falcon has in fact trained a model through the viewing of multiple known wafers, not that it is merely

capable of such an action.” (*Id.* at 28.) Rudolph presented evidence sufficient to enable a reasonable jury to conclude that Camtek used the Falcon in a manner that infringed claim 3, but Camtek offered no evidence to refute Rudolph’s showing, and the Court also granted summary judgment with respect to claim 3. (*Id.* at 36-37.) Because “the Federal Circuit limited the issues on remand to the training elements of claims 1 and 3 as they relate to the use of multiple, physically discrete wafers,” (*id.* at 17), the March 2014 order granting summary judgment to Rudolph on infringement of claims 1 and 3 addressed all remanded infringement issues.

ANALYSIS

I. CAMTEK’S MOTION FOR NEW PROCEEDINGS AND JURY TRIAL

In light of the Court’s summary judgment order, Camtek has moved for new proceedings and a jury trial to determine damages responsive to the new infringement scope. After reviewing the briefing and holding oral argument, the Court remains unclear about the precise authority for Camtek’s motion. Camtek cites no basis for the motion in their briefing. At oral argument, Camtek represented that its motion for new proceedings is not a Rule 59 motion for a new trial but rather a request for “an original trial” under the mandate rule. The Federal Circuit did not mandate a new jury trial in this case as part of its remand, however. As a result, the Court will treat Camtek’s motion as the closest analogue presented in Camtek’s briefs – a request for a jury trial pursuant to the Seventh Amendment guarantee in civil cases.

A. Standard of Review

The Seventh Amendment provides that “[i]n Suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved” U.S. Const. amend. VII. The right to a jury trial applies to patent infringement actions in which the plaintiff requests money damages. *See, e.g., Fresenius USA, Inc. v. Baxter Int’l, Inc.*, 733 F.3d 1369, 1379 (Fed. Cir. 2013). “This right exists only with respect to disputed issues of fact,” however, so “[a] grant of summary judgment does not violate the Seventh Amendment right to a jury trial.” *Harris v. Interstate Brands Corp.*, 348 F.3d 761, 762 (8th Cir. 2003).

B. Whether Material Facts Remain Disputed

Camtek alleges that material facts are disputed and thus the Seventh Amendment entitles them to a new jury trial on the issue of damages in this case. Specifically, Camtek asserts that a jury needs to determine whether lost profits are available, including whether some Falcon products constitute acceptable non-infringing alternatives; whether the patented feature drove demand for the whole product; and whether Rudolph is entitled to reasonable royalty damages. Because these matters have already been resolved by the Court or are not at issue, the Court will deny Camtek’s motion for a new jury trial.

The scope of the remand in this case was decidedly narrow. The Federal Circuit found the Court’s claim construction to be “in error so far as it defines a wafer as any portion of a wafer having two or more dies.” *August Tech.*, 655 F.3d at 1286. The

Federal Circuit instructed the Court as to the correct construction of the term “wafer” and indicated that “[b]ecause the jury was given a flawed claim construction, the verdict of infringement must be vacated.” *Id.* The Federal Circuit declined to make a determination as to whether Camtek’s product infringed even under the revised claim construction and “instead remand[ed] to the district court for a limited trial on infringement with respect to this claim element.” *Id.* The court explicitly did “not reach the parties’ contentions regarding damages.” *Id.* at 1290. The decision from the Federal Circuit gave no directions about the handling of money damages but merely stated that the court was remanding “for further proceedings consistent with this opinion.” *Id.* at 1291.

Following the Federal Circuit’s instructions, this Court conducted further proceedings, operating under the revised claim construction, and determined that Plaintiffs were entitled to summary judgment because Camtek’s Falcon product infringed under the new construction. The Court concluded that “[n]o material issues of fact remain as to whether Camtek’s product was capable of practicing the infringing method and did, in fact, practice such a method.” (Summ. J. Order at 2.) In so finding, the Court contemplated that the Falcon product could potentially be capable of being operated in a non-infringing manner. But the Court determined that summary judgment for Plaintiffs was appropriate because the only evidence on the issue indicated that Camtek trained its customers to use multiple discrete wafers when using the Falcon’s training function. Camtek provided no evidence to the contrary and in fact provided no evidence of any non-infringing uses of the Falcon by Camtek employees or customers during the relevant

time period. Consequently, the Court concluded that no issues of material fact remained as to infringement, which was the narrow question on which the Federal Circuit remanded.

Although a new jury was not empaneled for the purposes of making this determination, the grant of summary judgment was entirely consistent with the Federal Circuit's directive to hold "a limited trial on infringement." *August Tech.*, 655 F.3d at 1286. Indeed, "[w]here no material factual issues are present, a summary judgment proceeding is the functional equivalent of a new trial; under such circumstances a full-scale trial is neither necessary nor helpful." *Publishers Res., Inc. v. Walker-Davis Publ'ns, Inc.*, 762 F.2d 557, 559 (7th Cir. 1985). The grant of summary judgment does not leave any disputed infringement issues – such as the possibility that some Falcon devices constitute acceptable non-infringing alternatives – at the damages stage now, nor does it "violate [Camtek]'s right to a jury trial where, as here, the moving party [was] entitled to judgment as a matter of law." *Junk v. Terminix Int'l Co.*, 628 F.3d 439, 450 (8th Cir. 2010).

In light of the limited scope of the Federal Circuit's remand and this Court's March 2014 summary judgment order, no material issues of fact remain in this case. Thus, the first two issues Camtek argues require jury determinations – whether lost profits are available based on the possible existence of acceptable non-infringing alternatives and if so, what amount is appropriate, depending on whether the patented feature drove product sales – are no longer disputed issues requiring a jury finding. The remaining grounds Camtek cites as necessitating a jury determination – as to the

appropriate amount of reasonable royalty damages – are irrelevant because Rudolph clarified at oral argument that the Plaintiffs are not seeking reasonable royalty damages. All that remains to be done in this case is award damages; no disputed facts await a jury determination.

C. Reinstating the Jury's Original Damages Award

Rudolph asks the Court to reinstate the jury's original damages award now that infringement has been resolved under the revised claim construction. Camtek argues that to do so would be improper, citing the Federal Circuit's recent decision in *Apple Inc. v. Motorola, Inc.* (“*Apple-Motorola*”), 757 F.3d 1286 (Fed. Cir. 2014). In *Apple-Motorola*, Apple raised patent infringement claims based on multiple patents; Motorola counterclaimed based on its own patents, and each party pursued declarations of patent invalidity and non-infringement as to the other's patents. *Id.* at 1294. The district court granted summary judgment of non-infringement with respect to some patent infringement claims and excluded much of the expert testimony proposed by the parties as to damages for the remaining claims. *Id.* On appeal, the Federal Circuit found that the district court operated under an incorrect claim construction for one of the patents. *Id.* at 1300-04. The court concluded that the district court had erred by excluding expert testimony on damages and ultimately denying damages based on an incorrect claim construction. *Id.* at 1315-16. Under those circumstances, the Federal Circuit explained that the district court's error “would require reversal and remand because the erroneous claim construction . . . tainted the . . . damages analysis.” *Id.* Camtek avers that the same is

true in this case and a new jury trial is required to determine damages under the revised claim construction. The Court will reject this argument.

Camtek is correct that the original jury award was based on the old claim construction, but without more, that does not inherently and permanently divest the jury's calculation of all value to the Court. Because the award in this case was based on an incorrect claim construction, the Federal Circuit vacated the award and remanded, just as it did in *Apple-Motorola* when the district court's damages determination was based on a faulty claim construction. But if a new determination is made, under the corrected claim construction, that the jury's determination was based on an accurate scope of infringement, the jury's damages award can be revived. Such is the case here. The Court's March 2014 summary judgment order concluded that the scope of Camtek's infringement under the Federal Circuit's revised claim construction is identical to the scope of the infringement found by the jury under the incorrect claim construction. Rudolph is therefore entitled to the same amount of damages now that the jury was previously prepared to award.

Where the remand from the Federal Circuit is directed at claim construction and infringement, a district court may reinstate the jury's damages award where it is consistent with the Federal Circuit's opinion and mandate. For example, in *Cordis Corp. v. Medtronic Vascular, Inc.* ("Cordis"), 576 F. Supp. 2d 645 (D. Del. 2008), the jury found infringement and made a damages determination. *Id.* at 647, 653 n.11. The district court subsequently granted judgment as a matter of law ("JMOL") as to non-infringement of the patent at issue in the case; the Federal Circuit reversed the JMOL and remanded to

the district court. *Cordis Corp. v. Medtronic AVE, Inc.* (“*Cordis—JMOL*”), 339 F.3d 1352, 1356, 1365 (Fed. Cir. 2003). On remand from the Federal Circuit, the district court found no evidence in the record supporting the defendant’s argument that some of its products constituted non-infringing alternatives. *Cordis*, 576 F. Supp. 2d at 652. Accordingly, the court refused to “prolong this litigation further based on mere speculation” of acceptable non-infringing alternatives and denied the motion for a new trial on damages. *Id.* As a result of its infringement determination, the district court entered a final judgment for the plaintiff in an amount “comprised of the [original] jury’s verdict . . . together with damages for post-verdict sales . . . and prejudgment interest . . .” *Cordis Corp. v. Medtronic Vascular, Inc.* (“*Cordis—Final Judgment*”), Civ. Nos. 97-550, 98-19, 2008 WL 6579771, at *2 (D. Del. Sept. 30, 2008).³

As was the case in *Cordis*, no material issues of fact remain in this case as to the scope of the infringement on which damages must be based. Therefore, to empanel a new jury to make a second damages determination would merely offer Camtek another

³ Similarly, in *Lexion Medical, LLC v. Northgate Technologies, Inc.*, the jury found patent infringement by the defendant and awarded damages for Lexion; the defendant appealed, and the Federal Circuit vacated the jury’s verdict due to a claim construction error. 618 F. Supp. 2d 896, 898-99 (N.D. Ill. 2009). On remand, the district court granted summary judgment of infringement for the plaintiff, concluding that there was no evidence supporting non-infringement under the Federal Circuit’s revised claim construction. *Id.* at 900-01. In light of the entry of summary judgment, the court entered a final judgment nearly identical to the jury’s original damages award, without conducting additional proceedings on damages. (Case No. 04-cv-5705 (N.D. Ill.), Order of Final Judgment at 1, July 7, 2009, Docket No. 323 (awarding plaintiff damages in the amount of \$759,714.48); Minute Entry, Oct. 13, 2006, Docket No. 221 (noting jury’s verdict on damages in the amount of \$769,644.00).)

bite at the apple. This Court will not allow the parties to reargue issues that have already been decided.

Entering damages for Rudolph in the amount originally calculated by the jury, plus prejudgment interest, is the most appropriate course of action in this case. Where a jury has already awarded damages to a plaintiff, “a judicial re-assessment of a prior jury’s damage award would be in derogation of Defendant’s Seventh Amendment right to a jury trial.” *Oiness v. Walgreen Co.*, 838 F. Supp. 1420, 1422 (D. Colo. 1993). “Although the Circuit did not specifically remand for a new trial, the law in this area directs that this Court may not unilaterally determine the damage issue.” *Id.* Indeed, the very error for which the Federal Circuit reversed and remanded in *Apple-Motorola* was the district Court’s decision to “substitute[e] its own opinion” for the experts’ conclusions on which the jury relied in awarding damages. *Apple-Motorola*, 757 F.3d at 1316. Thus, the Court will not attempt to modify the jury’s calculation – based on an infringement scope that is co-extensive with the scope this Court found under the Federal Circuit’s new claim construction – but rather will proceed with the entry of a final judgment.

II. PLAINTIFFS’ MOTION FOR FINAL JUDGMENT AND PERMANENT INJUNCTION

A. Final Judgment

Because the Court granted summary judgment with respect to all remaining infringement issues, Rudolph moves for a final judgment in this case. Rudolph asserts that no fact issues remain unresolved, so there is no basis for waiting on the entry of a final judgment granting Rudolph damages as determined by the jury. As explained

above, the Court will grant this request. The Court concludes that further delay is not warranted because all infringement issues have been resolved. Under the Federal Circuit's revised claim construction, the same number of Camtek's products infringe Rudolph's patent as found at trial by the jury. Therefore, a final judgment reinstating the jury's damages award is appropriate at this time.

Rudolph also requests that the Court award prejudgment interest at the Minnesota statutory rate. Rudolph urges that "an award of prejudgment interest is necessary to ensure that the patent owner is placed in as good a position as he would have been in had the infringer entered into a reasonable royalty agreement." *Gen. Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655-56 (1983); *Bio-Rad Labs. v. Nicolet Instruments Corp.*, 807 F.2d 964, 967 (Fed. Cir. 1986). Specifically, Rudolph requests interest from the date of infringement until the date the Court enters its final judgment. *See Bio-Rad Labs.*, 807 F.2d at 967 ("The normal procedure under *Devex* is to award pretrial interest from the date of infringement to the date of payment"); *Nickson Indus., Inc. v. Rol Mfg. Co., Ltd.*, 847 F.2d 795, 800 (Fed. Cir. 1988).

The Court previously awarded prejudgment interest at the Minnesota statutory rate in the final judgment following the jury trial in this case. (Order on Final J. & Injunctive Relief at 3-4, Aug. 28, 2009, Docket No. 547 (accepting the Minnesota statutory rate as set out in Minn. Stat. § 549.09 and awarding prejudgment interest accordingly).) The Court will continue to apply the same rate of "ten percent per year" now. Minn. Stat. § 549.09, subd. 1(c)(2). Camtek protests that this will offer a windfall to Rudolph, because the five-year delay in this case was not prompted by Camtek's foot-dragging or

other bad-faith actions. Instead, Camtek asserts that the delay was due to Camtek's successful appeal of the claim construction issue to the Federal Circuit. Although the Court recognizes Camtek's concern, it is nevertheless the case that "the purpose of [awarding] prejudgment interest is to compensate the patentee for its 'foregone use of the money [the royalty payments] between the time of the infringement and the date of the judgment'" *Bio-Rad Labs.*, 807 F.2d at 969 (quoting *Devex*, 461 U.S. at 656). Camtek's contention that it succeeded in obtaining a revised claim construction on appeal is accurate, but as the Court has already explained, the revised claim construction did not alter the scope of infringement or the damages due Rudolph. Denying prejudgment interest for the intervening period of time "not only undercompensates the patent owner but may also grant a **windfall to the infringer** and create an incentive to prolong litigation." *Devex*, 461 U.S. at 655 n.10 (emphasis added).

Accordingly, the Court will honor the objective of Minnesota Statute § 549.09 and grant prejudgment interest on the damages and supplemental damages awards, at the Minnesota statutory rate. The Court will calculate prejudgment interest on the primary damages award from February 1, 2005⁴ until the date of this order entering final

⁴ As a general rule, "prejudgment interest should be awarded from the date of infringement to the date of judgment." *Nickson Indus., Inc.*, 847 F.2d at 800. In this case, the Court will use February 1, 2005, which is specified in Rudolph's amended complaint as the date on which August Technology Corporation put Camtek on notice that their Falcon device was an infringing product. (Am. Compl. ¶ 8, Apr. 12, 2006, Docket No. 103.)

judgment in this case. Prejudgment interest on the supplemental damages award will run from January 24, 2009 until the date of this order.⁵

B. Permanent Injunction

1. Standard of Review

A plaintiff seeking a permanent injunction must satisfy a four-factor test before a court may grant such relief:

(1) [T]hat [the plaintiff] has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.

eBay Inc. v. MercExchange, LLC, 547 U.S. 388, 391 (2006).

2. Former Injunction

The Court has previously determined that these four factors are met in this case by Camtek's infringement of the '6,298 patent. On August 28, 2009, the Court entered a permanent injunction against Camtek. (Order on Final J. & Injunctive Relief at 4-8.)

⁵ The supplemental damages award is based on four infringing sales, taking place on September 20, 2008; November 20, 2008; January 26, 2009; and May 29, 2009. (R&R ("Nov. 2010 R&R") at 3, 7-9, Nov. 17, 2010, Docket No. 683.) Supplemental damages were awarded for only two of the four infringing sales, however, based on Rudolph's 60% control of a multiple-supplier market. (Nov. 2010 R&R at 9.) Thus, the Court cannot base prejudgment interest on the dates of all four infringing sales. To capture the "infringement" date for the supplemental damages award as accurately as possible, then, the Court will use January 24, 2009, which is halfway between September 20, 2008 (the date of the first of the four additional infringing sales) and May 29, 2009 (the date of the last of the four additional infringing sales). The Court will again calculate the prejudgment interest at the Minnesota statutory rate of ten percent per year (or, on the supplemental damages award of \$645,946, \$176.97 per diem), until the date of this final judgment.

The injunction was based on the evidence presented to the jury, which the Court determined was sufficient to establish that Rudolph had “suffer[ed] and [would] continue to suffer irreparable harm, and that the remedies at law, such as monetary damages, would not adequately compensate [them] for their injury.” (*Id.* at 4.) The Court addressed all four factors under *eBay*, concluding that a permanent injunction was appropriate to prevent future infringements by Camtek.

Camtek challenged the permanent injunction on appeal to the Federal Circuit. In particular, Camtek disputed paragraph 5(a) of the injunction, which stated:

[Camtek is enjoined from] communicating with third parties (in person, via phone, via email, or by any other means) located in the United States for the purposes of offering to sell Falcon machines or machines that are colorable imitations thereof, notwithstanding where the third party intends to use the machines[.]

(*Id.* at 8.) When the Federal Circuit revised the claim construction in this case and vacated the jury’s damages award, the court also vacated the permanent injunction. *August Tech.*, 655 F.3d at 1281, 1290-91. The Federal Circuit left open the possibility that the Court could “craft[] an appropriate injunction” in this case if the Court found Camtek’s Falcon to infringe under the revised claim construction. *Id.* at 1291.

Because the Court previously determined that a permanent injunction was warranted in this case, and the Court confirmed that Camtek’s product infringed even under the new claim construction, the Court will re-issue a permanent injunction at this stage. As explained below, however, the Court will not fully reinstate the initial permanent injunction issued in 2009. Rather, to be consistent with recent Federal Circuit

precedent, the Court will modify the original injunction so as not to prohibit sales activities relating to products destined for consumers outside the United States.

3. Rudolph's Proposed Injunction and the Impact of *Transocean* and *Halo Electronics*

When the Federal Circuit vacated and remanded the injunction in this case, it directed the Court, if the Court found Camtek's product to infringe under the revised claim construction, to "take into account the effect, if any, *Transocean* has when crafting an appropriate injunction." *August Tech.*, 655 F.3d at 1291. In *Transocean*, the Federal Circuit considered "whether an offer which is made in [a foreign country] by a U.S. company to a U.S. company to sell a product within the U.S., for delivery and use within the U.S. constitutes an offer to sell within the U.S. under § 271(a). We conclude that it does." *Transocean*, 617 F.3d at 1309. The court went on to explain that "for an offer to sell to constitute infringement, the offer must be to sell a patented invention **within the United States**. The focus should not be on the location of the offer, but rather the location of the future sale that would occur pursuant to the offer." *Id.* (emphasis added).

Rudolph contends that the original permanent injunction, including paragraph 5(a), was fully consistent with *Transocean* and thus should be reinstated in its entirety. Rudolph asks the Court to read *Transocean* as referring only to offers for products to be delivered within the United States. *Transocean*, 617 F.3d at 1308-09. In line with that reading, Rudolph submitted a proposed permanent injunction largely identical to the August 28, 2009 injunction, with the addition of a new paragraph, which states:

8. Camtek is barred from meeting with potential customers anywhere in the world for the purposes of selling or using Falcons if the contemplated location of the delivery of the Falcon or use of the method of claim 3 is within the United States.

(Proposed Order on Final J. & Permanent Inj. at 7, May 19, 2014.)

Rudolph claims that the addition of paragraph 8 in its proposed injunction is also compatible with *Transocean* and the goal of preventing Camtek from making offers outside the United States for the sale of Falcons to be used within the United States. This interpretation appears to be based largely on the patent code's infringement or "offer to sell" provision, which states:

[W]hoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent.

35 U.S.C. § 271(a).

But Rudolph's arguments and proposed injunction run afoul of the Federal Circuit's recent decision in *Halo Electronics*. In *Halo Electronics*, the Federal Circuit made clear that a product whose contemplated sale occurs outside the United States does not infringe a U.S. patent. *Halo Elecs.*, 769 F.3d at 1381. In doing so, the court upheld the logic of *Transocean* and applied it to facts very similar to those found in the instant case. The court explained that the facts in *Halo Electronics* were "the opposite situation [from *Transocean*], where the negotiations [for a product sale] occurred in the United States, but the contemplated sale occurred outside the United States." *Id.* Although the factual scenarios were reversed – with *Transocean* involving negotiations outside the United States for a transaction within the United States – the Federal Circuit in *Halo*

Electronics employed the same reasoning underlying the decision in *Transocean*. *Id.*

The court announced its conclusion that the defendant in *Halo Electronics*

did not directly infringe the [Plaintiff's] patents under the "offer to sell" provision by offering to sell in the United States the products at issue, because the locations of the contemplated sales were outside the United States. . . . If a sale outside the United States is not an infringement of a U.S. patent, an offer to sell, even if made in the United States, **when the sale would occur outside the United States, similarly would not be an infringement of a U.S. patent.**

Id. (emphasis added).

Applying the Federal Circuit's reasoning from *Transocean* and *Halo Electronics* to this case, the Court concludes that both the original permanent injunction [Docket No. 547] and Rudolph's proposed permanent injunction are too broad. Both of those injunctions ban Camtek from selling the Falcon product to a third party notwithstanding where the third party intends to use the product. Such a provision cannot be reconciled with the Federal Circuit's ruling in *Halo Electronics* that "[a]n offer to sell, in order to be an infringement, must be an offer contemplating sale in the United States," *Id.* The Court will therefore grant Rudolph's motion for a permanent injunction but will modify, rather than reinstate in full, the 2009 permanent injunction, so that Camtek is not barred from negotiations or offers to sell when the contemplated destination is outside the United States.

C. Contempt Order

Halo Electronics bears not only on Rudolph's requested injunctive relief but also on the contempt order previously entered in this case. The Magistrate Judge found

Camtek in contempt of the Court's original permanent injunction for two Falcon product sales in late 2009. (Report & Recommendation ("Contempt R&R"), Aug. 11, 2011, Docket No. 731.) The recommended finding of contempt, which the Court adopted,⁶ was based on one Falcon sale for use in Malaysia and one Falcon sale for use in China. (*Id.* at 3.) Although Camtek held discussions and negotiations relating to the sales at locations in the United States, the contemplated destinations were both abroad. In 2011, the Court found them both to be infringing sales because of the negotiations and offers that took place in the United States. (*Id.* at 4-11.)

In light of the Federal Circuit's recent ruling in *Halo Electronics*, however, the Court finds that the Falcon sales to Malaysia and China are not infringing sales. Product discussions or even offers to sell that take place within the United States cannot convert into infringing sales products that are destined for consumers outside the United States. *Halo Elecs.*, 769 F.3d at 1381. Therefore, they do not constitute a basis for a contempt order and sanctions. The Court will accordingly vacate the contempt order and sanctions award based on the Malaysia and China Falcon sales.

ORDER

Based on the foregoing, and all the files, records, and proceedings herein, **IT IS HEREBY ORDERED** that:

⁶ The Court adopted the 2011 contempt Report & Recommendation in March 2012, imposing double damages. (Mem. of Law & Order, Mar. 3, 2012, Docket No. 764.) The Court subsequently reduced the sanctions award by half to \$645,946 so that they were compensatory rather than punitive. (Mem. Op. & Order at 2, 5-8, Aug. 17, 2012, Docket No. 913.)

1. In light of the Federal Circuit's recent decision in *Halo Electronics*, the contempt order and sanctions award [Docket Nos. 764, 913] is **VACATED**.

2. Defendant's Motion for New Proceedings and Jury Trial [Docket No. 966] is **DENIED**.

3. Plaintiffs' Motion for Final Judgment [Docket No. 981] is **GRANTED in part** and **DENIED in part** as follows.

a. Plaintiffs' request for a final judgment reinstating the original damages award is **GRANTED**. Defendant shall pay plaintiffs damages of \$7,428,436.00 (reflecting the original jury award of \$6,782,490.00 and the Court's supplemental damages award of \$645,946.00 [Docket No. 707]) for infringement of claims 1 and 3 of the '6,298 patent.

b. The Court awards prejudgment interest on the principal damages award in the amount of \$6,693,113.42 (calculated by applying the Minnesota statutory rate⁷ from the February 1, 2005 to the date of this order). The Court also awards prejudgment interest on the supplemental damages award in the amount of \$390,749.76 (calculated by applying the Minnesota statutory rate⁸ from

⁷ In this case, the rate dictated by Minnesota Statute section 549.09 (ten percent per year), applied to the principal damages award of \$6,782,490.00, yields a per diem interest of \$1,828.22.

⁸ Ten percent per year, applied to the supplemental damages award of \$645,946, yields a per diem interest of \$176.97.

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January 24, 2009 to the date of this order), for a total of \$7,083,863.18 in prejudgment interest.⁹ Post-judgment interest will be addressed separately.

4. Plaintiffs' Motion for Permanent Injunction [Docket No. 981] is **GRANTED in part** as follows:

a. Camtek is enjoined from making, using, selling, and offering to sell any of its Falcon machines and any machines that are colorable imitations thereof in the United States, **intended for sale and use within the United States**, until the expiration of the '6,298 patent. Falcon machines as used herein are Camtek's inspection machines that Camtek has referred to under the name Falcon regardless of the specific model numbers of the machines. An offer for sale is any communication – such as an advertisement, brochure, price quotation, product manual, webpage, verbal offer for sale, or the like – that contains sufficient information regarding the terms of sale for the Falcon machine and any machines that are colorable imitations thereof so as to constitute an offer under the applicable law.

b. Camtek is enjoined from practicing the method of Claim 3 or inspection methods that are colorable imitations thereof within the United States until the expiration of the '6,298 patent.

⁹ When the damages, supplemental damages, and prejudgment interest are combined, Camtek shall pay to Plaintiffs in this case a total of \$14,512,299.18.

c. The following specific enjoined activities fall within the conduct described in ¶¶ 2(c)(i)-(ii) above:

i. Communicating with third parties (in person, via phone, via email, or by any other means) **located anywhere in the world** for the purposes of offering to sell Falcon machines or machines that are colorable imitations thereof, **where the contemplated destination of the machine is within the United States.**

ii. Advertising or marketing the Falcon machines or machines that are colorable imitations thereof in the United States unless it is made clear on the marketing or advertisements that Camtek's Falcon machines or machines that are colorable imitations thereof are not for sale or use in the United States.

iii. Providing operator training for Falcon machines or machines that are colorable imitations thereof **within the United States** to the extent that such training is not directly tied to service and repair of such machines that were sold and delivered to customers prior to March 5, 2009; and

iv. Reconstructing the Falcon machines sold and delivered prior to March 5, 2009 located **within the United States**, which includes substantially improving or otherwise substantially changing such machines relative to the state in which they were originally accepted by the customer including, among other things, providing substantial software or hardware upgrades.

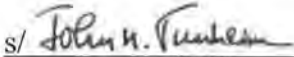
CASE 0:05-cv-01396-JRT-FLN Document 1010 Filed 02/09/15 Page 27 of 27

d. Camtek is also ordered to identify and secure **within the United States** (pending appeal), for possible destruction upon exhaustion of any and all appeals, all Falcon machines or colorable imitations thereof, not yet shipped to customers that are currently located **within the United States**.

e. Defendant Camtek Ltd. shall provide written notice of this judgment, and the injunction ordered herein, to: its subsidiaries (including but not necessarily limited to Camtek USA), parents, officers, directors, sales and service agents, servants, employees, attorneys, and any other persons who are in active concert or participation with the above-identified individuals and entities (herein referred to as "Camtek"). Defendant shall take whatever means are necessary or appropriate to ensure proper compliance with this order.

LET JUDGMENT BE ENTERED ACCORDINGLY.

DATED: February 9, 2015
at Minneapolis, Minnesota.



JOHN R. TUNHEIM
United States District Judge

UNITED STATES DISTRICT COURT

District of Minnesota

August Technology Corporation,
Rudolph Technologies, Inc.
a Delaware corporation

Plaintiff,

v.

Camtek, Ltd,

Defendant(s).

JUDGMENT IN A CIVIL CASE

Case Number: 05-cv-01396-JRT-FLN

☐ **Jury Verdict.** This action came before the Court for a trial by jury. The issues have been tried and the jury has rendered its verdict.

☒ **Decision by Court.** This action came to trial or hearing before the Court. The issues have been tried or heard and a decision has been rendered

IT IS HEREBY ORDERED that:

1. In light of the Federal Circuit's recent decision in Halo Electronics, the contempt order and sanctions award [Docket Nos. 764, 913] is VACATED.

2. Defendant's Motion for New Proceedings and Jury Trial [Docket No. 966] is DENIED.

3. Plaintiffs' Motion for Final Judgment [Docket No. 981] is GRANTED in part and DENIED in part as follows.

a. Plaintiffs' request for a final judgment reinstating the original damages award is GRANTED. Defendant shall pay plaintiffs damages of \$7,428,436.00 (reflecting the original jury award of \$6,782,490.00 and the Court's supplemental damages award of \$645,946.00 [Docket No. 707]) for infringement of claims 1 and 3 of the '6,298 patent.

b. The Court awards prejudgment interest on the principal damages award in the amount of \$6,693,113.42 (calculated by applying the Minnesota statutory rate from the

February 1, 2005 to the date of this order). The Court also awards prejudgment interest on the supplemental damages award in the amount of \$390,749.76 (calculated by applying the Minnesota statutory rate from January 24, 2009 to the date of this order), for a total of \$7,083,863.18 in prejudgment interest. Post-judgment interest will be addressed separately.

4. Plaintiffs' Motion for Permanent Injunction [Docket No. 981] is GRANTED in part as follows:

a. Camtek is enjoined from making, using, selling, and offering to sell any of its Falcon machines and any machines that are colorable imitations thereof in the United States, intended for sale and use within the United States, until the expiration of the '6,298 patent. Falcon machines as used herein are Camtek's inspection machines that Camtek has referred to under the name Falcon regardless of the specific model numbers of the machines. An offer for sale is any communication – such as an advertisement, brochure, price quotation, product manual, webpage, verbal offer for sale, or the like – that contains sufficient information regarding the terms of sale for the Falcon machine and any machines that are colorable imitations thereof so as to constitute an offer under the applicable law.

b. Camtek is enjoined from practicing the method of Claim 3 or inspection methods that are colorable imitations thereof within the United States until the expiration of the '6,298 patent.

c. The following specific enjoined activities fall within the conduct described in ¶¶ 2(c)(i)-(ii) above:

- i. Communicating with third parties (in person, via phone, via email, or by any other means) located anywhere in the world for the purposes of offering to sell Falcon machines or machines that are colorable imitations thereof, where the contemplated destination of the machine is within the United States.
 - ii. Advertising or marketing the Falcon machines or machines that are colorable imitations thereof in the United States unless it is made clear on the marketing or advertisements that Camtek's Falcon machines or machines that are colorable imitations thereof are not for sale or use in the United States.
 - iii. Providing operator training for Falcon machines or machines that are colorable imitations thereof within the United States to the extent that such training is not directly tied to service and repair of such machines that were sold and delivered to customers prior to March 5, 2009; and
 - iv. Reconstructing the Falcon machines sold and delivered prior to March 5, 2009 located within the United States, which includes substantially improving or otherwise substantially changing such machines relative to the state in which they were originally accepted by the customer including, among other things, providing substantial software or hardware upgrades.
- d. Camtek is also ordered to identify and secure within the United States (pending appeal), for possible destruction upon exhaustion of any and all appeals, all Falcon machines or colorable imitations thereof, not yet shipped to customers that are currently located within the United States.
- e. Defendant Camtek Ltd. shall provide written notice of this judgment, and the injunction ordered herein, to: its subsidiaries (including but not necessarily limited to

Camtek USA), parents, officers, directors, sales and service agents, servants, employees, attorneys, and any other persons who are in active concert or participation with the above-identified individuals and entities (herein referred to as “Camtek”). Defendant shall take whatever means are necessary or appropriate to ensure proper compliance with this order.

Date: 02/10/2015

RICHARD D. SLETTEN, CLERK

s/L. Sampson

(By)

L. Sampson, Deputy Clerk



UNITED STATES DISTRICT COURT District of Minnesota

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Edward J. Devitt U.S.
Courthouse and Federal
Building
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Fergus Falls, MN 56537
(218) 739-5758

CIVIL NOTICE

The appeal filing fee is \$505.00. If you are indigent, you can apply for leave to proceed in forma pauperis, ("IFP").

The purpose of this notice is to summarize the time limits for filing with the District Court Clerk's Office a Notice of Appeal to the Eighth Circuit Court of Appeals from a final decision of the District Court in a civil case.

This is a summary only. For specific information on the time limits for filing a Notice of Appeal, review the applicable federal civil and appellate procedure rules and statutes.

Rule 4(a) of the Federal Rules of Appellate Procedure (Fed. R. App. P.) requires that a Notice of Appeal be filed within:

1. Thirty days (60 days if the United States is a party) after the date of "entry of the judgment or order appealed from;" or
2. Thirty days (60 days if the United States is a party) after the date of entry of an order denying a timely motion for a new trial under Fed. R. Civ. P. 59; or
3. Thirty days (60 days if the United States is a party) after the date of entry of an order granting or denying a timely motion for judgment under Fed. R. Civ. P. 50(b), to amend or make additional findings of fact under Fed. R. Civ. P. 52(b), and/or to alter or amend the judgment under Fed. R. Civ. P. 59; or
4. Fourteen days after the date on which a previously timely Notice of Appeal was filed.

If a Notice of Appeal is not timely filed, a party in a civil case can move the District Court pursuant to Fed. R. App. P. 4(a)(5) to extend the time for filing a Notice of Appeal. This motion must be filed no later than 30 days after the period for filing a Notice of Appeal expires. If the motion is filed after the period for filing a Notice of Appeal expires, the party bringing the motion must give the opposing parties notice of it. The District Court may grant the motion, but only if excusable neglect or good cause is shown for failing to file a timely Notice of Appeal.

**United States Court of Appeals
for the Federal Circuit**

Rudolph Technologies, Inc. v. Camtek, Ltd., 2015-1434

CERTIFICATE OF SERVICE

I, Robyn Cocho, being duly sworn according to law and being over the age of 18, upon my oath depose and say that:

Counsel Press was retained by COOLEY LLP, Attorneys for Appellant to print this document. I am an employee of Counsel Press.

On **June 25, 2015** counsel has authorized me to electronically file the foregoing **Brief for Appellant (confidential and non-confidential versions)** with the Clerk of Court using the CM/ECF System, which will serve via e-mail notice of such filing to all counsel registered as CM/ECF users, including any of the following:

Daniel W. McDonald (Principal Counsel)
Rachel C. Hughey
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dmcdonald@merchantgould.com
rhughey@merchantgould.com

Additionally, the confidential brief will be emailed and paper copies will also be mailed to the above principal counsel on this same date.

Upon acceptance by the Court of the e-filed document, six confidential copies will be filed with the Court within the time provided in the Court's rules.

June 25, 2015

/s/ Robyn Cocho
Counsel Press

**CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION,
TYPEFACE REQUIREMENTS AND TYPE STYLE REQUIREMENTS**

1. This brief complies with the type-volume limitation of Federal Rule of Appellate Procedure 32 (a)(7)(B).

 X The brief contains 13,282 words, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(a)(7)(B)(iii), or

 The brief uses a monospaced typeface and contains lines of text, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(a)(7)(B)(iii).

2. This brief complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) and the type style requirements of Federal Rule of Appellate Procedure 32(a)(6).

 X The brief has been prepared in a proportionally spaced typeface using MS Word 2010 in a 14 point Times New Roman font or

 The brief has been prepared in a monospaced type face using in a characters per inch font.

June 25, 2015
Date

/s/ Wayne O. Stacy
Wayne O. Stacy
Counsel for Appellee